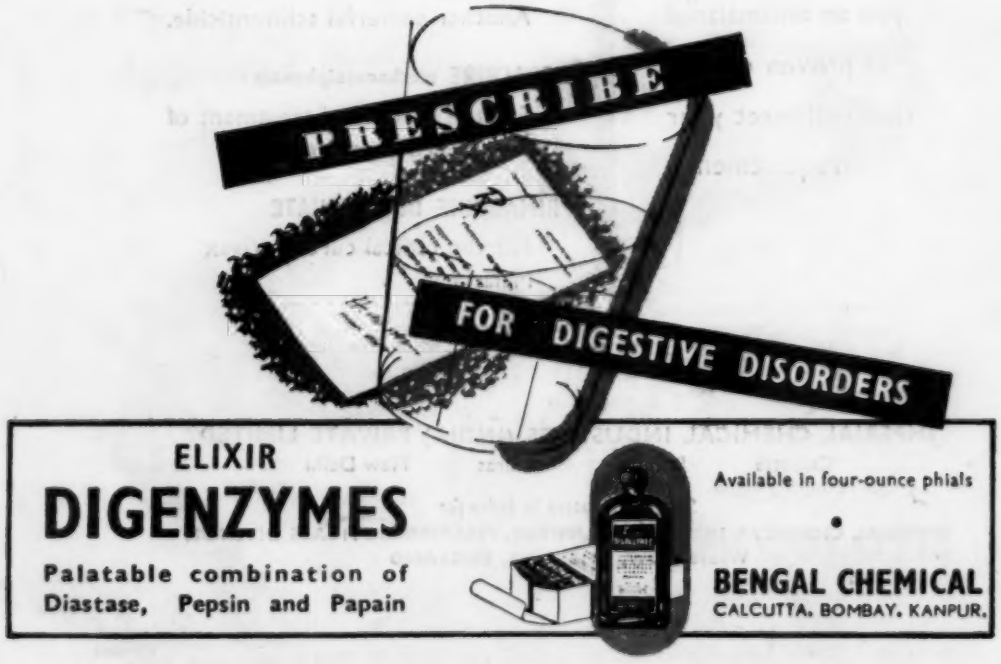
JOURNAL
of the
INDIAN MEDICAL ASSOCIATION

VOLUME 31 NUMBER 2 CALCUTTA JULY 16, 1958

Published twice a month. Annual Subscription: Inland Rs. 24/- : Foreign Rs. 30/- Single copy: Inland Re. 1/- ; Foreign Rs. 1.25



ANTIMALARIALS of proven efficacy

Whether your aim be prevention, radical cure or control of the acute attack of malaria, we can offer you an antimalarial of proven efficacy that will meet your requirements.

'PALUDRINE'

Probably, the safest and cheapest of all available antimalarials both for treatment and prevention.

'AVLOCLOR' (Chloroquine Phosphate B.P.)

The most rapidly acting of all schizonticides.

MEPACRINE hydrochloride

Another powerful schizonticide.

MEPACRINE methanesulphonate

For the parenteral treatment of malarial emergencies.

PRIMAQUINE DIPHOSPHATE

For the radical cure of Vivax Malaria.

IMPERIAL CHEMICAL INDUSTRIES (INDIA) PRIVATE LIMITED

Calcutta Bombay Madras New Delhi

Sole Distributors in India for

IMPERIAL CHEMICAL INDUSTRIES LIMITED, PHARMACEUTICALS DIVISION WILMSLOW, CHESHIRE, ENGLAND

ICP 480 A

TABLE OF CONTENTS

ORIGINAL ARTICLES: Page

1. The 1957 Influenza Epidemic: A Study of 500 Cases Admitted into the J. A. Group of Hospitals, Gwalior, M. P.—P. N. Laha and D. R. Bapat 53
2. A Clinical Study of 125 Cases of Influenza at Kanpur, Uttar Pradesh—K. N. Gour and K. K. Sikka 58
3. Study of Thyroid Function Using Radio-active Iodine—S. Kaul, Das Gupta and A. R. Subramanian 62
4. Haemoglobin Values of School Boys in Uttar Pradesh—K. K. Govil and K. C. Pant ... 65
5. Haematological Values and Their Variations Amongst Residents of Assam—B. Banerjee ... 67
6. Chronic Migrating Subcutaneous Eosinophilic Granuloma Caused by Unidentified Larvae of a Myiasis-Producing Fly—R. V. Rajam and R. Mahadevan 73

PRACTITIONERS' SERIES:

Myringotomy in Otitis Media—Keshav Kumar ... 80

SPECIAL ARTICLE: Page

Is Quinine a 'Dead' Drug? A Re-appraisal of its Medical and Other Uses—B. Mukerji ... 82

CASE NOTE:

Von Willebrand's Disease (Vascular Pseudohaemophilia)—Ajoy Kumar Roychowdhury and Dhrubabrata Bhattacharyya ... 87

EDITORIAL:

West Bengal Health Services 89

CURRENT MEDICAL LITERATURE 93

CURRENT TOPICS:

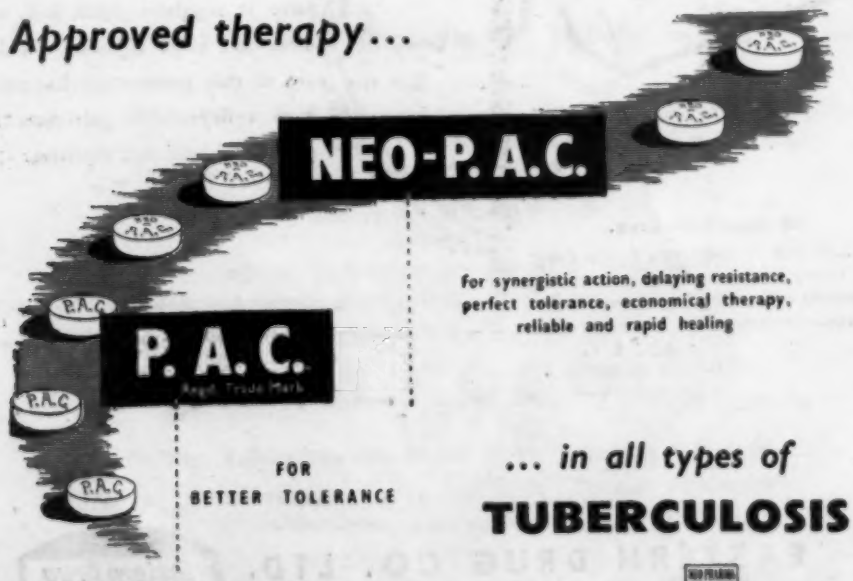
1. Background and Preliminary Organization of the W. M. A. 97
2. Constitution and By-Laws of the W. M. A. ... 98
3. Members of the W. M. A. 101

NOTES AND NEWS 102

REVIEWS 108

YOUR QUESTION 110

Approved therapy...



For synergistic action, delaying resistance, perfect tolerance, economical therapy, reliable and rapid healing

FOR BETTER TOLERANCE

... in all types of

TUBERCULOSIS

Manufactured by:
NEO-PHARMA PRIVATE LTD., Kasturi Bldgs., Churchgate Reclm., Bombay 1. Regd. T. M.

Bismozyme

The gastrointestinal regulariser

Prepared with bismuth and digestive enzymes Bismozyme forms a protective coating on the walls of the stomach and intestines and saves those organs from irritation caused by food and gastric secretion. By its soothing action on the gastrointestinal tracts it arrests muscle spasm and diminishes rigours of pain. It regulates gastric flow, heals up ulcer and helps digestion. Widespread use of this preparation has established it as a dependable gastrointestinal regulariser, healer and digestive.

A dependable Drug.

...To sum up Bismozyme 'Eastern Drug' is a very dependable drug for children's diarrhœa and is a valuable addition to our medical armamentorium.

ROY S K.
Ind Med. Rev. 1955. 33. 1.

EASTERN DRUG CO. LTD.
CALCUTTA-27

Eastern Drug

82/1/54

INDEX TO ADVERTISERS

	Page
Allen & Hanburys Ltd.	xi
Alembic Chemical Works Co. Ltd.	xiv
Adcco Ltd.	xxxii
Atlantis (East) Ltd.	xxxii
Alliance Trading Corporation Pvt. Ltd.	iii
All-India Manufacturers' Organisation	vi, vii
British Feisol Co. Ltd.	xix
British Overseas Airways Corporation	xxv
Bengal Immunity Co. Ltd.	xxvi
Bengal Chemical & Pharm. Works Ltd.	Front Cover
Ciba Pharma Private Ltd.	ix
Cipla Ltd.	x
Capco Private Ltd.	xxii
Crookes Laboratories Ltd.	xxxi
Chowgule & Co. (Hind) Private Ltd.	xxxiii
Dumex Private Ltd. (East Asiatic Co. (I) Private Ltd.)	xxi, xxvii
East India Pharmaceutical Works Ltd.	xx
Eastern Drug Co. Ltd.	ii
Geoffrey Manners & Co. Private Ltd.	xii, xxiv
Hindustan Lever Ltd.	xvi
Indian Oxygen Ltd.	xxix
Imperial Chemical Industries (India) Private Ltd.	2nd Cover
John Wyeth & Brother Ltd.	xviii, xxxiv
Lederle Laboratories (I) Private Ltd.	xxviii
May & Baker (India) Private Ltd.	xv
Mendine Pharmaceutical Works	xxxiii
Neo-Pharma Private Ltd.	i, v
Oriental Pharmaceutical Industries Ltd.	xxviii
Phytosynth Laboratories	xxxiii
Pfizer Eastern Corporation (Ravison Pharmaceuticals Pvt. Ltd.)	Back Cover
Ranbaxy & Co. Private Ltd.	xiv
Raptakos, Brett & Co. Private Ltd.	xv
Ravison Drugs Private Ltd.	iv
Standard Pharmaceutical Works Ltd.	xvii
Suhrid Geigy Trading Private Ltd.	xxiii
Smith Stanistreet & Co. Ltd.	xxx
Standard-Vacuum Oil Co.	viii
Trade Wings	3rd Cover
Usan Laboratories Private Ltd.	xix
Unichem Laboratories	xxiii
W. T. Suren & Co. Private Ltd.	xiii

ENTEROGUINE
BRAND TABLETS

A scientific combination of Iodo-chloro-oxyquinoline and Sulphaguanidine. Specific in the treatment and cure of any type of dysentery—both acute and chronic.

ALKAVIT
BRAND

Di-Sodium Hydrogen Citrate with Vitamin C.

Indicated in Pyrexia and Febrile conditions due to Catarrh, Cold, Cough and Influenza ; and also in Infectious diseases e. g., Typhoid, Pneumonia, Pox etc.

SULFOSOL
BRAND

Sodium Sulphacetamide Drops in 15% & 30% Solutions.

Indicated in :— Eyes—Conjunctivitis ; Blepharitis ; Corneal ulcerations.
Ears—Ottorrhoea ; Furunculosis ; Ulcerations ; etc.

MANUFACTURED BY :—

Alliance Trading Corporation Private Limited

15 SWINHOE LANE • KASBA • CALCUTTA-31.

New

One bottle serves all

RAVIPLEX*

(Orange-Peach flavoured)

An aqueous, non-alcoholic, non-syrupy multivitamin preparation useful as a nutritional supplement both for prevention and cure of vitamin-deficiencies.

Each 5 ml. contains:	
Vitamin A Palmitate, B. P.	5000 I.U.
Vitamin D_2, B. P.	1000 I.U.
Vitamin B_1, B. P. (Thiamine Hydrochloride)	3.5 mg.
Vitamin B_6, U.S.P. (Pyridoxine Hydrochloride)	1 mg.
Riboflavin, B. P. (Vitamin B_2)	2 mg.
Nicotinamide, B. P.	20 mg.
Panthenol	5 mg.
Vitamin C, B. P. (Ascorbic Acid)	50 mg.

Dosage:

Daily Therapeutic Dose:

Infants: 1 to 2 teaspoonfuls

Children and adults: 2 to 3 teaspoonfuls

Daily Prophylactic Dose:

Infants: ½ teaspoonful

Children and adults: 1 teaspoonful

Supply:

In pilfer-proof bottles of 2 oz. and 4 oz.

RAVISON

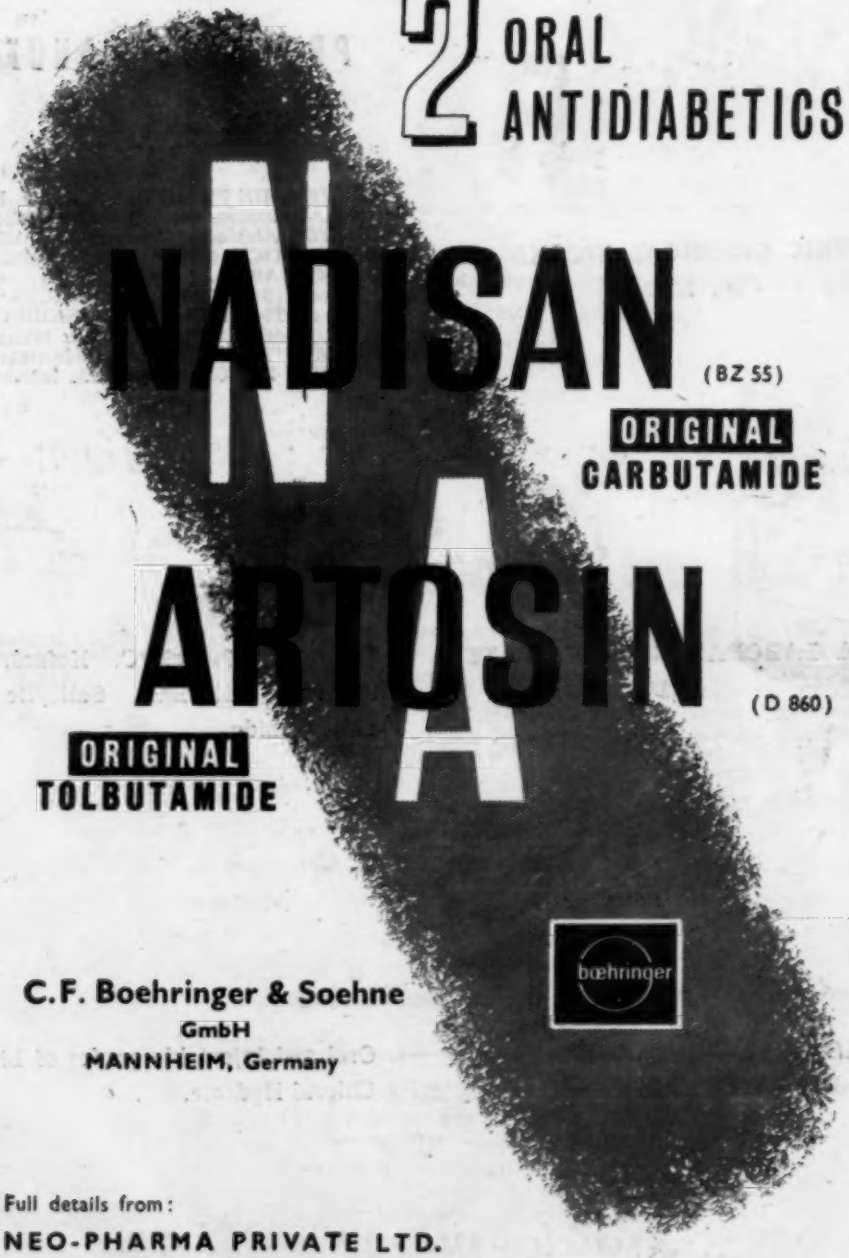
POTENCY . PURITY . PREDICTABILITY

Manufactured and Distributed by:

RAVISON DRUGS PRIVATE LTD.

Post Bag 10010, Bombay-1.

* Trademark of Ravison Drugs Private Ltd.



2 ORAL ANTIDIABETICS

NADISAN (BZ 55)

ORIGINAL CARBUTAMIDE

ARTOSIN (D 860)

ORIGINAL TOLBUTAMIDE

boehringer

C.F. Boehringer & Soehne GmbH
MANNHEIM, Germany

Full details from:
NEO-PHARMA PRIVATE LTD.
Kasturi Buildings, Churchgate Reclamation, Bombay-1

"KNOW THE INDIAN PHARMACEUTICAL

PRODUCTS MANUFACTURED

ALEMBIC CHEMICAL WORKS CO., LTD.	**(1) VITAMIN PRODUCTS: Alvite, Bivinal, Sharkoferrol, Protinules etc. (2) ANTIDYSENTERY PRODUCTS: Alchloqin, Bisaren with chloroquine. (3) ANTIBIOTIC PRODUCTS: Alprocin Inj. (4) ANTICATARRHAL PRODUCTS: Glycodin Terp Vasaka. (5) ANTACID PRODUCTS: Carbo-kaolin. (6) ANTI-TUBERCULAR PRODUCTS: Costrecin Inj., Alzide-PAS with vitamins tablets. (7) ANTI-ANEMIA PRODUCTS: Livules (four varieties). (8) SULPHA DRUGS: Sipromide tablets.**
ALTA LABORATORIES (PRIVATE) LTD.	Livofolco, Pensol C, Kofnol, Alta Carb Sodium Salicylate, Salicylic acid and Salicylamide.
BIOLOGICAL PRODUCTS (PRIVATE) LTD.	Oral and Injectable grades of Liver Extracts, Chloral Hydrate.

"WE KNOW MANY A LIFE DEPENDS

INDUSTRY BETTER".....(9)

BY SPONSOR MEMBERS.

BOMBAY PHARMACEUTICAL WORKS (PRIVATE) LTD.

VITAMIN PREPARATIONS, Poly-vit-hepar, Poly-vit-calcium, Minaferrol, Panovin, Elixir Panoplex, Winhepar.

OTHERS:—Elixir Cholinoplex, Elixir Poly-B-Complex, Elixir Panoplex, Elixir Sanguigen, Lactatone, mina ferrol.

✪

CHEMO-PHARMA LABORATORIES LTD.

VITAMINS: Biviplex, (B. Complex); Decab (Multi vitamins); Hyvitad (Vit. A. D. C.); Rubyvit (Vit. B 12).

PROPRIETARY & PATENT MEDICINES FOR INJECTABLE ORAL & TROPICAL USE. Analgets, Antamine, Chem-Sedon, Chem-Tonic, Chem-Viton, Chemocal B.D., Chemo-Mag, Chemo-Malt, Chemo-Tensyl, Diarzine, Gluron, Hypermine, Pectokab, P. V. P. 3.5% Solution (Plasma Substitute); Spasmodal, Theophenal, Chem-Hepar, Chem-Digeston.

✪

Special Committee for Pharmaceutical Industry
OF
THE ALL-INDIA MANUFACTURERS' ORGANIZATION
CO-OPERATIVE INSURANCE BUILDING,
SIR P. MEHTA ROAD, FORT,
BOMBAY 1.

ON HOW WELL WE DO OUR WORK"

Insect-free homes are healthier homes

FLIT

kills all household insects—**swiftly, surely!**

In the fight for better health, **FLIT** can play a great part—by destroying the household insects that *carry* so many deadly diseases.

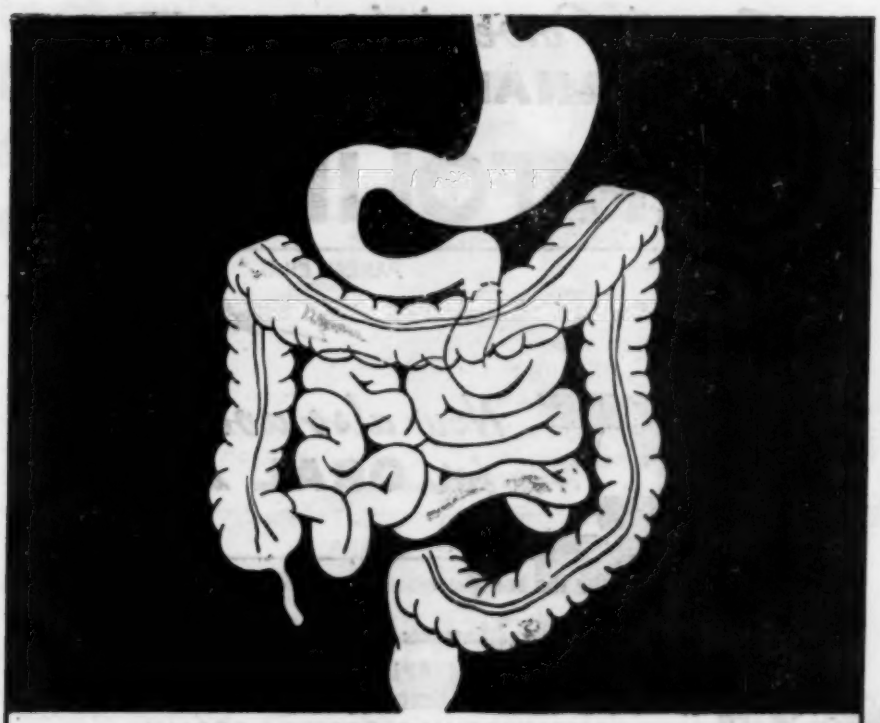
Six powerful insecticides—including D.D.T., Lindane and Thanite—work *together* in Flit. That's why its action is so swift, so sure; its effect so long-lasting!

For insect-free, healthier homes—FLIT ... *deadly* to insects, absolutely non-toxic to humans!

FLIT is by far the best insecticide available

STANDARD-VACUUM OIL COMPANY
(Incorporated in the U.S.A. with Limited Liability)

V. 6600



Formo-Cibazol

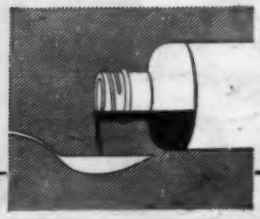
for the treatment of bacillary dysentery and other infectious intestinal diseases

CIBA

Most Powerful
ANTI-ANAEMIC REMEDY..

HEPAFOLIN CIPLA

PARENTERAL



Now also available for **ORAL** *use...*

Containing Proteolysed Extracts of :-

LIVER, STOMACH *and* **SPLEEN; VITAMIN B12, B-COMPLEX & FOLIC ACID, COLLOIDAL IRON** *and traces of* **MOLYBDENUM, COPPER & COBALT.**

EACH OUNCE CONTAINS:

Proteolysed whole extract derived from 40 G. of fresh liver.
Proteolysed whole extract derived from 6 G. of fresh stomach.
Proteolysed whole extract derived from 3 G. of fresh spleen.

Vitamin B12	... 10 mcg.	Coll. Sach. Iron Hydroxide (10% Iron)	2·5 c.c.
Folic Acid	... 2 mg		
Vitamin B1	... 10 mg.	Cobalt Carbonate	... 2 mg.
Vitamin B2	... 2 mg.	Copper Citrate	... 2 mg.
Vitamin B6	... 2 mg.	Molybdenum Trioxide	2 mg.
Pantothenyl Alcohol	2 mg.	Alcohol	... 4 c.c.
Niacinamide	... 25 mg.	Sugar & Flavouring Agent	q.s.

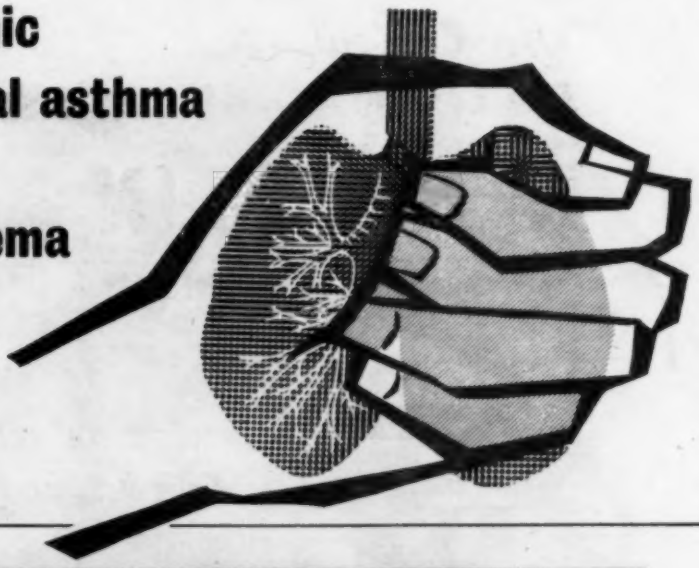
HEPAFOLIN Oral is an ideal therapeutic agent in the oral treatment of all kinds of anæmia. It produces rapid hæmatopoietic response and establishes effective rehabilitation of the circulatory and alimentary systems. For quick results Hepafolin *parenteral* may be used and followed up with Hepafolin *Oral*.

PRODUCT OF Cipla, BOMBAY-8.

LITERATURE SENT ON REQUEST.

Messrs. Advani Private Ltd.
3D, Garstin Place, Calcutta-1.

In chronic bronchial asthma and emphysema



CHOLEDYL*

before CHOLEDYL		after CHOLEDYL
	reduces the need for aerosol therapy	
	reduces coughing	
	increases vital breathing capacity	

- provides a degree of effectiveness that cannot be obtained from aminophylline
- increases cardiac output
- stimulates the respiratory centre
- prevents bronchospasm without central nervous stimulation
- helps relieve the interstitial œdema
- is well tolerated
- maintains efficacy during prolonged administration

Choledyl is available in tablets containing 100 mg. and 200 mg. choline theophyllinate and is supplied in bottles of 100 and 500 tablets.

ALLEN & HANBURYS LIMITED CALCUTTA & BOMBAY
(Incorporated in England; liability of members is limited)

* *under license from* WARNER-LAMBERT PHARMACEUTICAL COMPANY, NEW JERSEY, U.S.A., owners of the trade mark: United Kingdom patents No. 736,443 and South Africa patent No. 22,325.

58 270 IN

2 tablets to alleviate pain

'Anacin' is a non-toxic and clinically dependable analgesic and antipyretic combining Quinine, Phenacetin, Caffeine and Acetyl Salicylic Acid to provide powerful synergistic action against neuritis, neuralgia, rheumatism, muscular pain, headache, toothache and influenza. Often, a single dose of 2 tablets will alleviate the distress of pain and impart a sense of well-being.

'ANACIN'

ANALGESIC TABLETS

in packets of 2 tablets, containers of 32 tablets and bottles of 500 tablets

Made in India by:

GEOFFREY MANNERS & COMPANY PRIVATE LIMITED

Magnet House, Dougall Road, Bombay 1.

Trademark Proprietors:

WHITEHALL PHARMACAL COMPANY, NEW YORK, U.S.A.

I-33

T.C.F.

Vitadec

(Vitamins A, D, E with Calcium)

Each capsule contains:

Vitamin A, U.S.P.	6000 I.U.
Vitamin D, B.P.	1000 I.U.
Vitamin E	1.0 mg.
Calcium Lactophosphate	100 mg.

Excess vitamins have been added to compensate for any possible loss on storage.

Indications:

Avitaminosis due to poor absorption, infancy, pregnancy, lactation, rickets, tetany, osteomalacia, hypoparathyroidism, bone fractures, tuberculosis and cirrhosis of the liver.

Dosage:

One to four capsules daily or more as directed by the physician.

Packing:

Bottles of 30 and 100 capsules. Tins of 500 capsules.

A Product of

TEDDINGTON CHEMICAL FACTORY PRIVATE LTD., BOMBAY

Sole Distributors: **W. T. SURÉN & CO. PRIVATE LTD.**

P. O. Box 229, Bombay 1

New Introductions

FOR THE PROPHYLAXIS OR TREATMENT OF SINGLE OR MULTIPLE VITAMIN DEFICIENCIES THERE IS A ℞ VITAMIN PREPARATION NOW AVAILABLE UNDER THE BRAND NAME

℞ RANVIT

- Ranvit B Complex Injectable
- Ranvit B Complex Tablets
- Ranvit B Complex Elixir
- Ranvit C Injectable
- Ranvit C Tablets
- Ranvit B1 Injectable
- Ranvit B1 Tablets
- Ranvit B 12 Injectable
- Rancal 12 Injectable
- Ranvitol (Multivit)Tabs

RANBAXY & CO. PRIVATE LTD. P.O.BOX-104 NEW DELHI

Branches BOMBAY ● CALCUTTA ● MADRAS ● DELHI ● KANPUR

ASIAN A 36

for the treatment of **COUGH**

Glycodin Terp Vasaka (G.T.V.) soothes the irritation and inflammation of the respiratory mucosa, eases the cough reflex and relieves the dry irritating cough.

COMPOSITION:

Each 3.6 c.c. contains:-		
Antimony Potassium Tartrate B. P.	*0.4 mg.*	*(1/160 gr.*)*
Terpene Hydrate B. P. C.	*8 mg.*	*(1/8 gr.*)*
Codeine Phosphate B. P.	*8 mg.*	*(1/8 gr.*)*
Menthol B. P.	*2.7 mg.*	*(1/24 gr.*)*
Syrup Tolu B. P.	*0.9 c.c.*	*(15 min.*)*
Syrup Vasaka	*q. s.*	

Alembic **GLYCODIN TERP VASAKA**

Each 3.6 c.c. (fl. dr.) of G.T.V. with Guaiacol contains in addition:-*
Potassium Guaiacol Sulphonate B.P.C. 0.13 G. (2 gr.)*

* Approximate apothecary equivalent

ALEMBIC CHEMICAL WORKS CO. LTD., BARODA-3

YOU CAN PUT YOUR CONFIDENCE IN ALEMBIC

IN

RHEUMATIC ARTHRITIS

PROTRACTED

SALICYLATE THERAPY

WITHOUT

FALL IN PROTHROMBIN LEVEL

OBTAINS WITH

SUCCI-SALYL

ENTERIC COATED TABLETS

EACH CONTAINING

Calcium Succinate ... ... 150 mg.

Sodium Salicylate ... ... 250 mg.

DOSE: 4 tablets t.i.d. before meals. Bottles of 100, 500 & 1000

Particulars from:

RAPTAKOS, BRETT & CO., LTD. WORLI, BOMBAY.

The pathway of infection is broad and open

Inevitably, someone succumbs. When the symptoms of bacillary dysentery become evident, 'Thalazole' is indicated for immediate administration. The effect of this is dramatic. Within a few hours, griping ceases and diarrhoea is markedly reduced. Rapid convalescence may be anticipated.

INDICATIONS

BACILLARY DYSENTERY
TREATMENT OF CARRIER STATE
INFANTILE GASTRO-ENTERITIS
ULCERATIVE COLITIS
ESTABLISHING PRE-OPERATIVE INTESTINAL ASEPSIS

Supplied as 0·5 Gm. tablets and as a suspension
Detailed literature is available on request.

MANUFACTURED BY
MAY & BAKER LTD

'THALAZOLE'
trade mark brand
PHTHALYLSULPHATHIAZOLE

Distributed by: MAY & BAKER (INDIA) PRIVATE LTD • BOMBAY • CALCUTTA • GAUHATI • MADRAS • NEW DELHI MA3798-118

Fat and the daily diet

In planning a satisfactory diet, every doctor has to consider not only the modern scientific knowledge about nutrition, but also the cost and 'satiety value' of such a diet. Thus, it is possible to prescribe the best available nutrition compatible with the lowest cost.

Among the principal nutrients in our diet, proteins, fats and carbohydrates are often termed 'proximate principles'; they are also referred to as energy-yielding food factors since they are 'burnt' or oxidised in the body to provide the energy for life. Fat is a necessary ingredient of a diet. Weight for weight, it yields twice as many calories as carbohydrates or protein.

By contributing a large amount of energy, fat relieves the intestinal tract of the necessity for dealing with an excessive amount of carbohydrate food, and to a certain extent, it spares protein. It also aids in the digestive functions and favours absorption of fat soluble factors. Fat is also included in the diet for its flavour, lubricant action and 'satiety value' which Werner has particularly stressed.

The energy value of refined oils and of fats such as DALDA Vanaspati is fully equal to that of animal fats like ghee and butter. Vanaspati has a higher calorific value than butter on account of the varying quantities of water contained in the latter. Langworthy in the U.S.A. has demonstrated convincingly that the digestibility coefficients of vegetable oils hardened up to a melting point as high as 45°C are of the same order as those for butter fat and liquid vegetable oils.

As regards absorption, Deuel has found that margarine and shortening (the latter is similar to vanaspati) have the same rate of absorption as butter fat and lard. In the latest study from the University of Southern California, Alfin-Slater *et al.* report that rats have subsisted for 46 generations on diets in which selectively hydrogenated vegetable oils comprised practically the sole source of fat. The performance of the animals as judged by gain in weight, longevity and histopathological examination of the tissues have shown that hydrogenated fats are safe, fully digestible and have full nutritional value.

Fat is also included in the diet because it can act as a carrier of fat-soluble vitamins A and D. Lack of Vitamin A is the single factor responsible for a large number of deficiency diseases. In some parts of the tropics, deficiency of Vitamin A is quite high. Lack of Vitamin D causes rickets. According to Health Bulletin No. 23 (a Government of India publication), minor degrees of rickets are probably more common in Indian infants and young children than is generally believed.

DALDA Vanaspati is a cooking fat made from pure vegetable oils according to strict Government specifications and its melting point does not exceed body temperature (37°C). It is fortified with 700 I.U. of Vitamin A and 56 I.U. of Vitamin D per ounce. Thus DALDA is highly nutritive, yet reasonably priced. It makes a valuable contribution to the middle class Indian diet which is so often lacking in such essential nutrients as fats and vitamins.

REFERENCES—Werner S.C.: New Eng. J. Med., *252*, 661.
Langworthy C.F.: Ind. Eng. Chem., *1923*, 276.
Deuel H.J. (Jr.): J. Nutr. *1955*, 337.
Alfin-Slater R.B., Wells A.F., Aftergood L. and Deuel H.J. (Jr.): J. Nutr. *1957*, 241.

A PRODUCT OF HINDUSTAN LEVER LTD, BOMBAY

DL. 484-20

VITAMIN MINERAL CAPSULE

Composition

Each capsule contains

Vitamin A	2,000	I.U.
,, D	500	I.U.
,, B_1	5.0	mg.
,, B_2	2.0	mg.
,, B_6	1 0	mg.
,, B_{12}	2.0	mcg.
,, C	20.0	mg.
Folic Acid	0.25	Mg.
Nicotinamide	10.0	mg.

POLYVITIN

Calcium Pantothenate	2.5	mg.
Calcium Phosphate	50.0	mg.
Ferrous Sulph. (Exic.)	20.0	mg.
Manganese	0.03	mg.
Iodine	0.02	mg.
Magnesium	0.2	mg.
Cobalt	0.001	mg.
Copper	0.001	mg.

Phials of 25 and 50 capsules.

STANDARD PHARMACEUTICAL WORKS LTD.
67, Dr. Suresh Sarkar Road, Calcutta-14

Bring the Bael to carry the Quin ★

★ IODO-CHLORO-OXYQUINOLINE to you!

The picture tells a story—the story of a new formula for the effective treatment of amoebic and bacillary dysenteries. The 'Quin' (Iodo-chloro-Oxyquinoline) is always in a hurry, it rushes through the intestinal tract and achieves very little by itself. The Standard Pharmaceutical Works have introduced Bael which forces the 'Quin' to travel very, very slowly. This ensures intimate contact of this drug with all parts of the gut. Known as *Sulpha-Quino-Bael*, this formula (see details) provides maximum amoebicidal and bacteriostatic effect.

Each spoonful measure as supplied inside each carton, contains

Iodo-chloro-oxyquinoline	0.2 gm.
Sulphadiazine	0.033 gm.
Sulphathiazole	0.1 gm.
Sulphaguanidine	0.067 gm.
Baked Bael powder	1.1 gm.
Isaphgul powder	0.2 gm.
Magnesium Carbonate (Pond)	0.2 gm.

SULPHA QUINO BAEL

Available both in Granules & Powder

SQBI-58

Standard Pharmaceutical Works Ltd. Calcutta-14

FOR SPRAINS, STRAINS AND MUSCLE SPASM

a new, powerful unction

'Algipan' supersedes all surface applications for relief of pain by the use of the potent new penetrative agent, methyl nicotinate, in conjunction with the powerful vasodilator, histamine. Methyl nicotinate opens the way for the histamine to penetrate tissues rapidly. There it promotes prolonged, pain-relieving hyperaemia, comforting analgesia and soothing warmth.

ALGIPAN*

Analgesic Cream

. . . for symptomatic relief of *muscular aches*, pains and stiffness associated with fatigue, over-exertion, *muscle strains*, *fibrositis*, *arthritis*, *neuritis*, *sprains* . . . during physical rehabilitation following immobilisation for fractures; to calm the symptoms in bronchitis and other respiratory disorders. A non-greasy, cosmetically pleasing cream, requiring only gentle surface friction for application.

Wyeth

Packing :
Tubes of 40 Gm.

JOHN WYETH & BROTHER LIMITED
(Incorporated in England with Limited Liability)
Steelcrete House, Dinshaw Wacha Road, Bombay 1. * Trade Mark

J. 36

Introducing .....

PYRUSAN
LIQUID

A drug of choice for the treatment of Nausea and vomiting due to pregnancy, radiation sickness, motion sickness, in neuritis due to I.N.H., vitamin B-Complex deficiency etc.

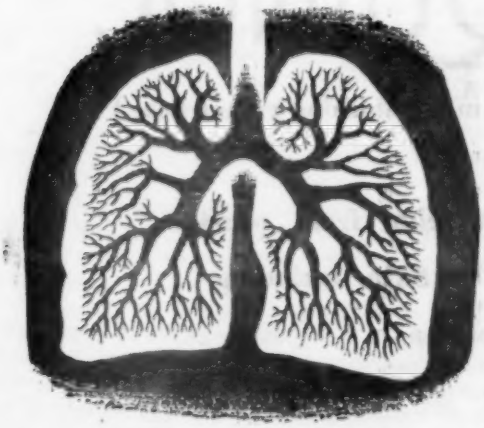
Composition
Each 30 ml contains

Pyridoxine hydrochloride	U.S.P.	40 mg.
Riboflavin	B.P.	2 mg.
Thiamine hydrochloride	B.P.	10 mg.
Niacinamide	B.P.	50 mg.
Ascorbic Acid	U.S.P.	50 mg.
Flavoured Syrup		Q.S.

: PACKING :
Available in bottles of 4, 8 and 16 ozs.

Detailed particulars on request from:

USAN LABORATORIES PRIVATE LTD.
13, DATTATRAY ROAD,
SANTACRUZ WEST,
BOMBAY 23.



Tax-free Dispensing Pack available

IMMEDIATE CONTROL OF ASTHMA

Doctors everywhere have for years been prescribing FELSOL for the relief it gives in asthma. Pharmacists can stock FELSOL with complete confidence since it is used and recommended by members of the medical profession in hospitals, private practice and Government departments in all parts of the world to which it has been introduced.

Clinical sample and literature on request.

THE ANGLO-FRENCH DRUG COMPANY (ESTN.), LTD.
34-36 TARDEO ROAD, BOMBAY, 7.

BRITISH FELSOL COMPANY LTD

PATENT

LOCULA

10%, 20%, 30%, Solutions and 10% Ophthalmic Ointment of Sodium Sulphacetamide

For

Conjunctivitis and other forms of Inflammatory Diseases of the Eye

★

DERMO-QUINOL

(4% & 8% Iodochloro-oxyquinoline in a vanishing cream base)

✪

Local application gives prompt relief from pruritus in various forms of Diseases of Skin, including Pruritus Vulva.

East India Pharmaceutical Works Ltd.

CALCUTTA—26.

Journal of the Indian Medical Association

VOLUME 31
NUMBER 2

PUBLISHED TWICE A MONTH
EDITOR—P. K. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.)

CALCUTTA
JULY 16, 1958

ORIGINAL ARTICLES

THE 1957 INFLUENZA EPIDEMIC*

A Study of 500 Cases Admitted into the J. A. Group of Hospitals, Gwalior, M.P.

P. N. LAHA, M.D. (PAT.), M.R.C.P. (LOND.), M.R.C.P. (EDIN.), D.C.H. (ENG.)

AND

D. R. BAPAT, M.B., B.S. (AGRA)

Department of Medicine, G. R. Medical College and J. A. Group of Hospitals Gwalior, M. P.

INTRODUCTION

The 1957 influenza epidemic received global publicity. The disease was first seen in Hong Kong and Singapore in April. Subsequently in May in rapid succession almost simultaneous epidemics occurred in Japan, Formosa, the Philippines, Borneo and Indo-China. Towards the end of this month and during June outbreaks occurred in various parts of India. The epidemic engulfed Gwalior during mid-June to mid-August. The attack rate varied in various populations, though some areas had suffered more severely than other areas.

Influenza in not a new disease. Its sporadic prevalence is nothing unusual. But it gains in importance during its epidemic occurrences. Epidemics of influenza could be traced with fair degree of accuracy for two and a half centuries. Epidemics of varying intensity have occurred every few years, with more devastating pandemics at longer and irregular intervals. Years 1847-48, 1889-92 and 1918-19 had to face pandemics of influenza. Since 1918 the general trend of influenza mortality has been downward, though punctuated by moderately severe epidemics every four to eight years.

MATERIAL AND METHOD

During its epidemic period in Gwalior a large number of its population was afflicted with the disease. Between the 1st June and the 30th August 618 patients were treated in the J. A. Group of Hospitals. From among them 500 cases, consisting of 477 adults and 23 children up to the age of 12 years, admitted during the period of from the 1st June to 31st July, 1957, were studied by us. The present paper is based on that study.

It is considered useful to detail some indication as to what constitutes 'typical influenza'. On the first day the patient has a headache, feels unwell and shivery. He has a disturbed sleep due to attacks of dry cough. The patient has a miserable feeling with aching in the back and limbs. Usually he is irritable. The temperature rises to 102·0°F., and there is frontal headache of varying intensity, anorexia and a sense of prostration. On the following day the temperature shows moderate remission, but the cough and bodyache persist. On the third day either the temperature remits or rises higher, and the cough continues. The fever usually subsides after 3—5 days. Sometimes the fever subsides after 7 days.

* Paper read before the Staff Scientific Society, G. R. Medical College, Gwalior, on the 1st March, 1958.

Observations and Discussion

WEEKLY ADMISSIONS :

From Table 1 it will be apparent that the epidemic in Gwalior was in full swing from the third week of June, reached its peak in the third week of July and started ending from the third week of August. In other words, the epidemic lasted for about two months, between the middle of June and the middle of August. The epidemic in Gwalior had followed a few days after its onset at Delhi and Agra. The epidemic period in Gwalior differed from that in Bombay, where it started in May and ended in June (Advisory Research Committee Report, 1957). It is probable that the wave of the epidemic in Delhi and Gwalior had its origin at Bombay.

Table 1—Showing Weekly Admissions

Month and weekly date	No. of admissions
1st to 7th June	2
8th to 14th June	6
15th to 21st June	31
22nd to 28th June	62
29th June to 5th July	83
6th to 12th July	98
13th to 19th July	119
20th to 26th July	92
27th July to 2nd August	70
3rd to 9th August	33
10th to 16th August	12
17th to 23rd August	8
24th to 30th August	2
Total	618

INCIDENCE :

Incidence in relation to population density—Gwalior consists of Lashkar, Gwalior and Morar. A direct relationship was observed between the incidence of the epidemic and population density (Table 2). Lashkar, having the maximum population density, had the largest number of cases, and Morar, with the minimum population density, had the smallest number of cases.

Table 2—Showing Incidence in Relation to Population Density

Area	No. of cases
Lashkar	360
Gwalior	134
Morar	6
Total	500

Incidence in relation to community—From Table 3 it will be apparent that the largest number of cases (483) were from the Hindu community, a few (12) from the Muslim community and a fewer still (5) were from the Christian and other communities. The difference in the incidence of cases in relation to community was due to the difference in the population of different communities. In other words, the incidence in relation to community was in direct proportion to the community population.

Table 3—Showing Incidence in Relation to Community

Community	Population	Percentage of total population	No. of cases	Percentage of incidence
Hindu ...	2,13,773	88·7	483	96·6
Muslim ...	23,759	9·8	12	2·4
Christian & others ...	3,625	1·5	5	1·0
Total ...	2,41,157		500	

Table 4—Showing Incidence in Relation to Age

Age group in years	No. of cases	Percentage
0— 5	5	1·0
6—10	10	2·0
11—15	20	4·0
16—20	100	20·0
21—25	159	31·8
26—30	112	22·4
31—35	53	10·6
36—40	14	2·8
41—45	5	1·0
46—50	4	0·8
Above 50	18	3·6

Incidence in relation to age is shown in Table 4.

The youngest patient was a female infant aged 10 months and the oldest a man aged 80 years.

The majority of the affected fell in the category of young adults, as evidenced by its incidence being 31·8, 22·4 and 20·0 per cent in the age groups of 21—25, 26—30 and 16—20 years respectively. It means that the incidence was 74·2 per cent in the age group of 16—30 years, proving thereby that young adults constituted three-fourths of the total number of cases. Similar incidence was observed in the epidemic at Bombay (Advisory Research Committee Report, 1957). Therefore, it was concluded that in Gwalior, as in Bombay,

young adults were more susceptible to the disease. The difference in the incidence in relation to age groups could only be explained on the supposition that there was difference in their immunological status by way of the titer of neutralising antibodies. In this connection the work of Davenport *et al* (1953) would be a pointer. They were the first to observe that the antibody response formed in early childhood by exposure to the strains of virus then current is indelibly imprinted on the antibody pattern throughout life. It is, therefore, possible that just as persons over 35 to-day possess antibodies to the swine influenza virus, perhaps because the latter's antigen is similar to a previous human pathogen, some imprint of the Asian virus may also be found in sera from certain age groups (Leading article, *Brit. M. J.*, 1957).

Incidence in relation to sex—In adults the incidence showed marked male predominance, 7 males : 1 female. In children too the incidence showed male predominance, 5 males : 1 female. The difference in the incidence between males and females was significant. Similar difference in incidence in relation to sex was observed in Bombay by the Advisory Research Committee (1957) and Patel, deMello, Aiyar and Wray (1957). It was only probable that females, who lead less of outdoor life, had less chances of contacting the infection.

Incidence in relation to occupation—The epidemic affected people of every variety of occupation. But the largest number from adults was contributed by police constables (138 cases, i.e., 28·9 per cent) and labourers from mill areas (115 cases, i.e. 24·1 per cent). In other words, more than half of the total adult cases were from police constables and mill labourers. The occupation *per se* could not be held responsible for the aforesaid increased incidence among police constables and mill labourers. The constables were living in barracks and the labourers in crowded colonies. Their living under crowded conditions was the factor responsible for affecting large groups of them simultaneously.

Incidence in relation to income—Early in the epidemic the majority of patients were poorer people living in the most crowded and unhealthy environments. But as the disease spread further people living in better circumstances were also affected. Similar were the observations in the epidemic at Kuala Lumpur (Gordon Smith *et al*, 1957).

METHOD OF SPREAD :

The main sources of infection were the diseased, who were probably infective in the late incubation period as well as during the first few days of illness. The disease must have been a droplet-spread aerial infection. Fomites probably played a part in transmitting the infection.

ATTACK RATE :

There were obvious difficulties in estimating correctly the total number of people attacked. Roughly estimated, the attack rate at Gwalior was 20 per cent of the population.

SYMPTOMS ON ADMISSION :

Symptoms on admission are detailed in Table 5.

Adults—The onset was rapid in all the cases. In about 10 per cent of the cases 6 to 8 hours after the onset, the patients felt well and remained so for about 6 to 8 hours, but a typical attack followed after the aforesaid 'silent' interval. Symptoms belonging to different systems in varying proportions were also observed. Fever, headache, cough and bodyache constituted the major

TABLE 5—SHOWING SYMPTOMS ON ADMISSION

Symptoms	No. of cases			
	Adults (477)	Percentage	Children (23)	Percentage
Fever ...	433	90·8	23	100·0
Headache ...	416	87·2	9	39·1
Cough ...	380	79·7	18	78·3
Bodyache ...	331	69·4	13	56·5
Coryza ...	71	14·9	11	47·8
Vomiting ...	46	9·6	3	13·0
Rigor ...	43	9·0	2	8·7
Pain in chest ...	38	8·0	—	—
Pain in throat	37	7·7	2	8·7
Pain in abdomen	27	5·7	—	—
Severe prostration ...	20	4·2	—	—
Dyspnoea ...	14	2·9	—	—
Backache ...	12	2·5	—	—
Nausea ...	11	2·3	—	—
Giddiness ...	10	2·1	—	—
Diarrhoea ...	10	2·1	—	—
Increased frequency of micturition	10	2·1	—	—
Pain in joints ...	7	1·5	—	—
Pain in eyeballs	2	0·4	1	4·3
Haemoptysis ...	2	0·4	—	—
Epistaxis ...	1	0·2	—	—
Anuria ...	1	0·2	—	—
Stupor ...	1	0·2	—	—
Spasm in hands	1	0·2	—	—
Bilateral deafness ...	1	0·2	—	—

tetrad of symptoms. In the study of the epidemic at Bombay (Advisory Research Committee Report, 1957) it was observed that pyrexia associated with general symptoms of bodyache, headache, giddiness and cough constituted the main symptoms. Patel *et al* (1957) in their study of the June 1957 influenza epidemic in an industrial organisation in the city of Bombay observed the main symptoms to be headache, fever, weakness, lassitude and bodyache. So one could conclude that fever, headache and bodyache were the three common symptoms at Gwalior and Bombay. While at Bombay, as evidenced by the two aforesaid studies, prostration or weakness/lassitude was an important feature, at Gwalior it was not so prominent, though present in some of the cases, being only 4·2 per cent. In the epidemic at Aden epistaxis was fairly common (Fawdry, 1957). But in our series and also in the series at Bombay it was a rare symptom. Giddiness or dizziness constituted an important symptom at Bombay, while at Gwalior it was not so significant, being only 2·1 per cent. There was a small proportion with only local symptoms—coryza, sorethroat and pain in the throat. And in them fever was mild. The term 'febrile catarrh' has been used for these cases (Stuart-Harris, 1937 ; Stuart-Harris and Francis, 1938 ; Wauchope, 1935) but it is very difficult to differentiate it from influenza on purely clinical grounds (Stuart-Harris, 1945). American workers have drawn attention to a similar condition they call 'catarrhal fever' (U. S. Nav. Lab. Res. Unit, 1944). The differential points from influenza, as pointed out by them, are the insidious onset of catarrhal fever, the predominance of respiratory as opposed to constitutional symptoms, the productive and paroxysmal cough, and the frequency of pharyngitis and tonsillitis with exudate. On clinical grounds we were of the opinion that our cases with only local symptoms were of mild attack of influenza. In the absence of viral study of our cases we could not go beyond our clinical judgment. Unless complete laboratory studies are carried out, cases will be labelled as influenza that are not and *vice versa*. But in the face of an epidemic one will have the justification to call such cases as those of influenza.

Children—The onset of the disease was similar to that in adults. In them fever, cough, bodyache and coryza constituted the four major symptoms. In the epidemic at Bombay the main symptoms were fever, cough, vomiting, restlessness and coryza (Advisory Research Committee Report, 1957).

A detailed study of fever revealed the following features. In the majority of the cases (total 316) it ranged between 101·1° and 103·9°F.; in 98 cases between 98·4° and 100·0°F. ; and in 42 cases between 104·0° and 105·6°F. (total cases with fever being 456). The fever was diphasic (i.e. showing a secondary rise after a fall lasting for about 12 to 18 hours) in 98 cases.

In our series vomiting and rigor were sometimes very prominent. Atypical symptoms, e.g., dyspnoea, giddiness, increased frequency of micturition, etc., were also observed. They depended on the system which bore the brunt of the disease.

PHYSICAL SIGNS :

The face was flushed and the eyes looked congested. The tongue was furred. The pulse rate was raised in proportion to the rise of temperature. Bradycardia was found in 57 cases. Upper respiratory disorder was found in nearly 80 per cent of the cases. Involvement of the lung was a rare feature as determined clinically. Toxaemia was present in about one-eighth of the cases. A study of the blood pressure in the adult cases revealed the following findings: Systolic—range 100 to 140 mm. of Hg. with 112·2 as the mean, and diastolic—range 60 to 90 mm. of Hg. with 67·1 as the mean. The lower range of blood pressure was found in the toxic cases. No case showed hypotension, which appeared to be a significant finding in nearly one-third of the cases at Bombay (Advisory Research Committee Report, 1957). The finding of hepatosplenomegaly seemed to be an incidental one in keeping with that found in the hospital class of patients. Probably it was the legacy of old malarial infection. Profuse sweating was a very prominent feature in our cases. But it did not make any overt impression on the temperature.

The study of the clinical picture of the disease led us to conclude that bodyache, a characteristic symptom of the disease, was due to generalised acute non-articular rheumatism (fibrositis), and the ache was the manifestation of muscle spasm centrally induced through irritated nerve roots. Headache, another characteristic symptom of the disease, in the majority of the cases, was also due to the same non-articular rheumatism. We came to the aforesaid conclusion regarding the cause of headache from the fact that it disappeared as soon as the patient was free from bodyache, and there was no radiological evidence of sinusitis which when occurring as a complication of influenza could be responsible for the said complaint. But in a few cases sinusitis occurred as a complication, and it took a long time to disappear. Post-influenzal asthenia was the legacy of myasthenia. Other symptoms were due to the affection of different systems.

LABORATORY FEATURES :

The following laboratory investigations were done in 100 cases :

(1) Blood cytology—Majority (91 per cent) showed normal leucocytic count (4000-10000), a few (5 per cent) showed leucocytosis (more than 10,000) and the remaining few (4 per cent) showed leucopenia (less than 4000). It was concluded that in the majority of the cases the leucocyte count was within the normal range.

(2) Blood sedimentation rate (Westergren) was found to be normal in 16 cases and increased in 84 cases.

(3) Routine urinalysis showed that the reaction was acid in all the cases with transient albuminuria in 11 cases.

COURSE OF THE DISEASE :

The course lasted for 3 to 5 days in the majority of the cases. But in some of the cases it was prolonged up to 7 days.

COMPLICATIONS :

We had not come across any mentionable complication. This was due to the fact that the present Asian virus was not very virulent. It was also due to the fact that secondary bacterial invasion played insignificant part in the natural history of the disease at Gwalior, as evidenced by the absence of leucocytosis in the majority of the 100 cases whose blood was examined and the absence of any significant response in cases who were treated with chemotherapy and/or antibiotics.

CONVALESCENT STAGE :

For about a week the majority of the patients had asthenia of varying degrees and were unable to resume their normal duties. The symptoms of upper respiratory disorder lasted for about a week to ten days after the cure. In some cases the sinusitis, which occurred as a complication, took a long time to disappear. In a number of cases anorexia lasted for about four to five days after they were fever-free.

RELAPSE RATE :

It was about 5 per cent. Patients, who did not take rest during the convalescent stage, were more liable to get the relapse.

MORTALITY :

It was nil in the series under review.

TREATMENT :

General measures—All the cases were treated in separate wards to prevent infection to other patients of the hospital, as far as possible. They were kept under complete rest. The same was enforced for at least four days even after the temperature touched normal, because as said above, premature activity was an important cause of relapse. Adequate nursing was given. Light diet with fluids up to 5000 c.c. daily in adults was given. The diet in children consisted mostly of milk, and sufficient water.

Drugs—To study the comparative value of different drugs, the patients were divided into five groups (Table 6). From an analysis of the results of treatment by different drugs (Table 6) we arrived at the following conclusions : In the first group of 237 cases salicylates, the dose varying according to age, were administered in the form of a mixture. All the cases were cured within 3-7 days. The second group of 193 cases were treated with salicylates, as in group 1, plus intramuscular injections of 2½ lac units of crystalline penicillin every 12 hours till the temperature touched normal. All the cases in this group were cured within 3-7 days. The third group of 30 cases were treated with salicylates as in the first group plus one intramuscular injection daily consisting of 1 lac units of buffered crystalline penicillin, 3 lac units of procaine penicillin and 0·5 g. of dihydrostreptomycin till the temperature was normal. All the cases in this group were cured within 3-7 days. The fourth group of 20 cases were treated with 0·5 g. tablet of sulphonamide three times daily till the temperature was normal, and they were cured within 3-7 days. In the fifth group of 20 cases 2½ lac units of crystalline penicillin was injected every 12 hours till the patient was fever-free, and all the cases were cured within 3-7 days. It was, therefore, obvious that the number of days required to cure the patients in each of the five groups were 3 to 7. Hence, it was concluded that drugs did not modify the course of the disease.

TABLE 6—SHOWING DRUGS USED IN DIFFERENT GROUPS

Group	Drugs used	Number of cases
I	Salicylates	237
II	Salicylates plus crystalline penicillin ...	193
III	Salicylates plus crystalline & procaine penicillin and dihydrostreptomycin	30
IV	Sulphonamide	20
V	Crystalline penicillin	20
	Total ...	500

The question arose with us as to whether penicillin could be used prophylactically, either in all the patients at the onset of the disease or in contacts who had not had the disease till then. We decided against the use of penicillin in either group for the following two reasons. The first was that little was known of the importance of various pathogens in the causation of the serious respiratory complications, e.g. pneumonia. The removal of the sensitive organisms could therefore leave the respiratory coast clear and vulnerable for other relatively insensitive organisms, such as *H. influenzae*. The second reason was that the widespread use of penicillin could have favoured the development of drug-resistant bacteria which could, in turn, give rise to untreatable complications in other members of the population. The latter argument was particularly applicable to our hospital where patients of different other diseases were also being treated.

Summary

A study of influenza epidemic at Gwalior amongst 500 cases, consisting of 477 adults and 23 children, admitted during the period of from 1st June to 31st July, 1957 has been made.

A direct relationship has been observed between the incidence of the epidemic and population density. The incidence in relation to community has been in direct proportion to the community population. The majority of the affected has been in the age group of 16 to 30 years (74·2 per cent). Both in adults and children there has been marked male predominance. It has affected people of every variety of occupation.

The attack rate has been, as roughly estimated, 20 per cent of the population.

A list of atypical symptoms has been given. Laboratory features have been described. In the majority of the cases blood cytology has shown normal leucocytic count.

The course has lasted from 3 to 5 days in the majority of the cases. In some cases it has been prolonged to 7 days.

No mentionable complications have been met with.

The relapse rate has been about 5 per cent.

The mortality has been nil.

The cases have been treated with different drugs, and their results analysed and discussed.

Acknowledgments

Our thanks are due to Dr. A. S. Misra, the Superintendent of the J. A. Group of Hospitals, Gwalior, for his co-operation in treating the cases and also for his permission to publish the reports of the cases.

Our thanks are due to Dr. A. P. Bhatnagar, other house physicians and the nursing staff for their help.

Our thanks are also due to many others who have helped us in collecting the data regarding the epidemic and also for their help in preparing the paper.

References

Advisory Research Committee Report—(Report of the Influenza Research Committee, Bombay, on influenza cases during the influenza epidemic in May and June, 1957) *Indian J. M. Sc.*, **11** : 593, 1957.

Davenport, F. M., Hennesy, A. V. and Francis, T., Jr.—*J. Exper. Med.*, **98** : 641, 1958

Fawdry, A. L.—*Lancet*, **2** : 335, 1957.

Gordon Smith, C. E., Turner, L. H. and Helliwell, C. J. V.—*Brit. M. J.*, **1** : 1412, 1957.

Leading Article—(Influenza Virus Variants) *Brit. M. J.*, **1** : 1517, 1957.

Patel, J. C., deMello, E. R., Aiyar, A. A. and Wray, E.—*Indian J. M. Sci.*, **11** : 610, 1957.

Stuart-Harris, C. H.—*Brit. M. J.*, **2** : 516, 1937.

Idem—Ibid, **1** : 209, 1945.

Stuart-Harris, C. H. and Francis, T., Jr.—*J. Exper. Med.*, **68** : 803, 1938.

U. S. Naval Laboratory Research Unit—*Nav. med. Bull.*, Wash., **42** : 27, 1944.

Wauchope, G. M.—*Lancet*, **1** : 878 & 949, 1935.

A CLINICAL STUDY OF 125 CASES OF INFLUENZA AT KANPUR, UTTAR PRADESH

K. N. GOUR, M.D., M.R.C.P. (EDIN.), F.R.F.P.S.G., D.C.H. (ENG.), D.P.H.

Professor of Medicine

AND

K. K. SIKKA, M.D.

Lecturer in Medicine

Department of Medicine, G.S.V.M. Medical College Kanpur

Influenza has always been recognised to possess the power of rapid dissemination throughout the world. It suddenly flares up into a devastating pandemic. The disease has at times appeared so unexpectedly as to suggest a visitation from without and its occurrence was regarded with a feeling of terror especially after successive waves of 1918-19 pandemic. Though large scale epidemics had been experienced before 1850 there was an apparent lull amounting almost to extinction of the disease in the period just before 1890. After the pandemic of 1890 an increase in the incidence of this disease was observed, which

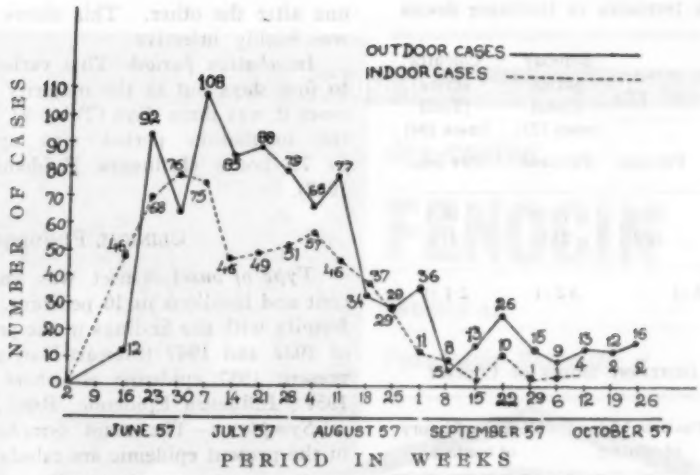


FIG. 1—SHOWING WEEKLY INCIDENCE OF INDOOR AND OUTDOOR CASES.

is still persisting. Since the isolation of the virus, major epidemics have occurred every four to eight years with only minor epidemics in intermediate years. Incidence in 1948 was lowest since 1918, while major epidemics occurred in 1933, 1937, 1943 and 1951 and lastly in 1957.

MATERIAL AND METHOD

The study was undertaken at the Parbati Pagla I. D. Hospital, Kanpur. 873 patients attended the O.P.D. out of which 611 were admitted in the inpatients. The patients were seen during the months of June, July, August, September and October, 1957. Those who attended the O.P.D. and those who were admitted in the inpatients are shown in Fig. 1.

The epidemic suddenly started in the second week of June, the first case having been reported in this hospital on the 9th June, 1957. From 9th June the attendance increased and reached its peak towards the end of June and the beginning of July, 1957. After the middle of July 1957 the incidence started declining and reached its lowest by the end of the 1st week of September 1957 after which it remained at a fairly low level.

Though there were 873 patients who attended the O.P.D. and out of which 611 were admitted, this report which is being presented is based on 125 inpatients only.

AETIOLOGY

Age incidence—Details are shown in Table 1. The youngest was a 2 years old male child.

It is interesting to note that the incidence was appreciably low below 10 years and higher between 11 and 30 years (68·8 per cent). In Bombay series (Advisory Research Committee Report, 1957) 74·6 per cent cases occurred between 11 and 30 years and in Calcutta series (Sen Gupta, 1957) only 52·48 per cent were between 11 and 30 years. In Great Britain the present epidemic (1957) largely affected the children group (Influenza Epidemic, *Brit. M. J.*, 1957).

TABLE 1—SHOWING AGE INCIDENCE IN DIFFERENT SERIES

Age groups in years	Present series (Total cases 125)		Bombay series (Total cases 121) Per cent	Calcutta series (Total cases 194) Per cent
	Number	Per cent		
1 to 5 ...	3	2·4	—	6·7
6 to 10 ...	8	6·4	—	
11 to 20 ...	34	27·2	22·6	26·2
21 to 30 ...	52	41·6	52	26·28
31 to 40 ...	21	16·8	13·9	29·8
41 to 50 ...	4	3·2	4·9	4·7
51 or above ...	3	2·4	6·6	5·1

1918-19 influenza had the liability to attack children and young adults and the bulk of the cases were well under 40 years (Nash, 1919). Thus the present epidemic (1957) resembles 1918-19 pandemic as regards age incidence with the exception that children were affected to a lesser degree in the present series.

Sex incidence is shown in Table 2. The ratio between males to females was 3·5 : 1 in the present series. In the Bombay series it was 3·2 : 1 and in the Calcutta series it was 2·1 : 1.

TABLE 2—SHOWING SEX INCIDENCE IN DIFFERENT SERIES

Sex	Present series (Total cases 125)		Bombay series (Total cases 121)	Calcutta series (Total cases 194)
	Number	Per cent	Per cent	Per cent
Male ...	97	77·6	76·04	68·5
Female ...	28	22·4	23·9	31·5
Ratio M:F ...	3·5:1		3·2:1	2·1:1

TABLE 3—SHOWING DIFFERENT MODES OF CONTACT

Mode of contact	Positive history of contact		Negative history of contact	
	Number	Per cent	Number	Per cent
History of influenza in the family ...	22	17·6	103	82·4
History of influenza at place of work	15	12	110	88
History of contact with an influenza case ...	31	24·8	94	75·2

TABLE 4—SHOWING INCUBATION PERIOD

Number of patients	Number of days between contact and onset of symptoms	Total number of days
4	One	4×1 =4
2	Two	2×2 =4
51	Three	51×3=153
11	Four	11×4 =44
68		205

Average mean incubation period=205/68=3·01 days.

History of contact—History of contact was found in 54·4 per cent of this series (Table 3). In Bombay series history of contact was present in 61·8 per cent. Details are shown in Table 3.

As the epidemic was widespread in the town, it was difficult to consider that the remaining 45·6 per cent cases in this series who denied any history of direct contact with a case of influenza could have remained away from any contact either in the house or at the place of work.

Infectivity—It was a common feature to see the whole family struck down either simultaneously or one after the other. This shows that the disease was highly infective.

Incubation period—This varied from 24 hours to four days but in the majority (75 per cent) of cases it was three days (Table 4). In Great Britain the incubation period was approximately 48 to 72 hours (Influenza Epidemic—*Brit. M. J.*, 1957).

CLINICAL FINDINGS

Type of onset—Onset was sudden in 84 per cent and insidious in 16 per cent. This is in conformity with the findings in the previous epidemics of 1937 and 1947 (Stewart-Harris, 1953) and the present 1957 epidemic elsewhere (Guthrie *et al*, 1957; Influenza Epidemic, *Brit. M. J.*, 1957).

Symptoms—The main symptoms of influenza in the present epidemic are tabulated (Table 5).

TABLE 5—SHOWING SYMPTOMS IN DIFFERENT SERIES

Symptoms	Present series Per cent	Bombay series Per cent	Calcutta series Per cent
Fever	98·4	97·5	100
Headache	93·6	90·9	40·7
Bodyache	94·4	91·7	70·8
Pain in chest ...	68·8	24·8	nil
Running from nose / Blocking of nose / Post-nasal catarrh	76	10·8	86·8
Sorethroat ...	84	nil	44·8
Cough	80·8	76·0	88·1
Sputum (expectoration)	24	nil	nil
Vomiting	40	43·7	4·6
Giddiness	4·8	76	1·4
Abdominal pains ...	4	18·2	2·06
Diarrhoea	nil	5·7	5·5
Epistaxis	nil	1·7	0·05
Haemoptysis ...	nil	1·7	1·02
Fainting attacks ...	nil	nil	1·5

There is an agreement between our series and the Calcutta series (Sen Gupta, 1957), but some points of contrast exist especially with regard to pain in the chest, expectoration and headache.

It is surprising to note that sorethroat has not been recorded in Bombay series though on physical examination congestion of the pharynx alone and the pharnyx and the palate was reported in 46·25 per cent and 33·9 per cent of the cases respectively. 84 per cent in our series and 44·8 per cent in Calcutta series had sorethroat either in the beginning or during the course of the illness. The incidence of sore throat appears to be much more

For the first time in India

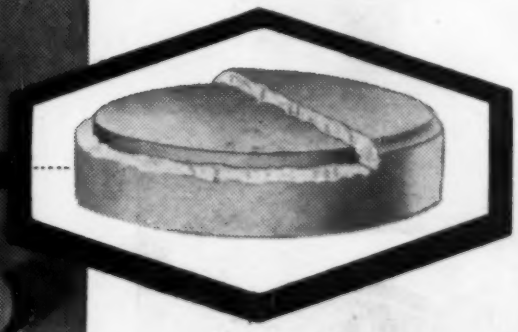
dry-coated

FENOCIN

tablets of

Potassium Penicillin V

a DUMEX exclusive



THE hygroscopic and thermolabile qualities of Penicillin V call for *special* protection as its antibiotic activity deteriorates in the presence of moisture.

DUMEX now presents the *first moisture-protective, temperature-conditioned* coating ever to be made in India. Known as 'dry-coating', it affords the Penicillin V content complete protection against variations of atmospheric conditions. FENOCIN, therefore, brings you *fully-protected* Penicillin V for *full-potency* action.

Available in bottles of 12, each FENOCIN tablet contains 130 mg. Potassium Phenoxy-methyl Penicillin

Dry-coating ensures
individual tablet protection!

DUMEX

DUMEX PRIVATE LIMITED
Wavell House, Ballard Estate, Bombay 1.

DX. 6913

Cosome

the palatable cough syrup for children and adults.

For coughs,
whooping cough,
bronchitis,
influenza
and colds

EM-80

Bottles of 140 ml. and 1 kg.

E. Merck
DARMSTADT · GERMANY

SOLE AGENTS FOR INDIA
CAPCO PRIVATE LIMITED, E. MERCK DEPARTMENT
P.O. Box 1652, Bombay-1

marked as compared to 1937, 1943 and 1947 epidemics (Stuart-Harris, 1953).

Giddiness was a prominent feature in Bombay series while 62 per cent had this feeling in 1937 epidemic. Pain chest has not been mentioned in Calcutta series while 24·8 per cent complained of it in Bombay series as compared to 68·8 per cent in our series. Anorexia, shivering, ocular symptoms, insomnia, epistaxis, sweating, constipation present in 1937, 1943 and 1947 epidemic (Stuart-Harris, 1953) were completely absent in our series. They have not been recorded by Calcutta or Bombay observers.

There is a general unanimity among those who have described the clinical events during epidemics proved to be due to the influenza viruses that a great diversity of clinical manifestation is witnessed. It is certainly remarkable that many of the larger epidemics since 1880 had had features which distinguished them from the previous epidemics. In one epidemic nasal catarrh had been the prominent feature. In another fauces and larynx were principally involved. In some gastro-intestinal symptoms have been very common while in others nervous system has been attacked. In 1918 epidemic the brunt of the disease was borne by the respiratory system (Nash, 1919). In the present epidemic the disease has been generally of a febrile type with marked constitutional symptoms but with a low incidence of complications.

Physical signs—The physical signs were few (Table 6).

TABLE 6—SHOWING ANALYSIS OF PHYSICAL SIGNS

Physical signs	Present series Per cent	Bombay series Per cent
Pyrexia	96	95·8
Conjunctival injection	16	64
Congestion of pharynx and throat ...	48	10·15
Abdominal tenderness ...	4	17·4
		Liver +, tenderness of abdomen.
Coated tongue ...	4	—
Flushing of face ...	2·4	—
Bronchopulmonary signs	12	50·3
Bilateral	7·2	36·4
Right lung alone ...	3·2	7·3
Left lung alone ...	1·6	6·6
Pulse :		
Tachycardia ...	4	—
Bradycardia ...	40	18·8
Normal rate ...	56	—

Owing to the mild nature of the present epidemic many of the physical signs noted in the previous epidemics of 1918, 1937, 1943 and 1947 were absent. The general impression carried is that the physical signs were mostly of a typical case of influenza of mild nature with no complications.

COURSE OF ILLNESS

The course was uneventful in the majority of the cases. The duration of illness was less than five days in 70·4 per cent, between 6 and 7 days in 22·4 per cent, between 8 and 9 days in 4·8 per cent and above 10 days in 2·4 per cent in this series.

COMPLICATIONS

Respiratory system was involved in 12 per cent. Vomiting was present in 40 per cent. Abdominal pain was recorded in 4 per cent.

MORTALITY

No death occurred in this series. This has been due to the fact that there were only few complications and that too of a mild nature. Lim *et al* (1957) quoted by Roberts (1957) had no death in 298 cases which they observed in Singapore. Guthrie *et al* (1957) reported two deaths among the 350 patients admitted in Ahmadi Hospital during the present Asian influenza. Roberts (1957) during a period of six weeks examined 12 cases of fatal influenza out of which three had an associated mitral stenosis, the other nine patients were previously healthy. Bacteriological examination of his cases revealed that *staphylococcus aureus* was the predominant organism in the trachea and lungs while in 1918-20 epidemic *H. influenzae* was the chief organism isolated from these sites.

TREATMENT

Only symptomatic treatment was given to the patients in the form of salicylates and diaphoretic mixtures in combination with analgesics wherever necessary. Antibiotics like penicillin were used only in cases with lung signs.

FOLLOW-UP OBSERVATIONS

Most of the cases of influenza turned up in the out-patient department complaining of post-influenzal lassitude, weakness and headache which took quite a number of days before the patients felt normal.

Summary

A total of 125 cases were studied.

The peak reached towards the end of June and the beginning of July, 1957.

The incidence was lowest at the end of the first week of September, 1957.

The epidemic was very mild with marked constitutional symptoms and high rate of infectivity. Physical signs were few.

The incidence was the highest in patients between 11 and 30 years (68·8 per cent) and lowest in those past 40 years and below 10 years. Ratio of male to female in the present series was 3·5 : 1.

54·4 per cent cases gave positive history of contact.

Average incubation period was three days.

Complications were few. The respiratory system was involved in only 12 per cent.

Duration of pyrexia was less than five days in 88 per cent.

Duration of illness ranged from two to five days in 70·4 per cent.

Symptomatic treatment with salicylates and diaphoretic mixture was adequate. Penicillin was used only in cases with lung signs.

Most of the cases came to the out-door complaining of post-influenzal lassitude, weakness and headache.

Acknowledgments

We are thankful to Dr. C. B. Singh, Principal and Chief Superintendent, Medical College and L. L. R. & Associated Hospitals and Dr. Raj Bahadur Mathur, Superintendent, Parbati Bagla I. D. Hospital, Kanpur, for permission to undertake this work.

References

Advisory Research Committee Report, Bombay—*Indian J. M. Sc.*, **11** : 594, 1957.

Guthrie, J., Forsyth, D. M. and Montgomery, H.—*Lancet*, **2** : 590, 1957.

Influenza Epidemic—*Brit. M. J.*, **2** : 1056, 1957.

Lim, K. A., Smith, A., Hale, J. H. and Glass, J.—*Lancet*, **2** : 791, 1957. Quoted by Roberts, G. B. S. (19573.

Nash—Influenza Epidemic of 1918-19, *Lancet*, **2** : 686, 1919.

Roberts, G. B. S.—*Lancet*, **2** : 944, 1957.

Sen Gupta, D. N.—Enquiry on the incidence of influenza in Calcutta and suburbs, 1957, Report obtained from Annual Meeting of I.C.M.R. held in K. G. Medical College, Lucknow in 1957.

Stuart-Harris, C. H.—Influenza and other virus infections of the respiratory tract, Published by Edward Arnold & Co., London, 1953, p. 3.

STUDY OF THYROID FUNCTION USING RADIO-ACTIVE IODINE*

S. KAUL, M.D. (PB.), M.R.C.P. (LOND.), LT.-COL., A.M.C.

Armed Forces Medical College & Military Hospital

DAS GUPTA, M.SC.

National Chemical Laboratory

AND

A. R. SUBRAMANIAN, M.B.B.S. (MAD.), CAPT.

Military Hospital

Poona

Introduction

Investigation of the thyroid functions in health and disease has engaged the attention of physiologists and clinicians for a long time. The quantity of iodine, both in the organic and inorganic forms, circulating in the body is very small. Chemical and even biological estimations of such minute quantities have obvious limitations. It is, therefore, not surprising that tests, although very useful for research studies, were highly unsuitable for universal application, particulary in clinical practice. In spite of repeated attempts at refinement of the technique for chemical and biological assays, the position remained unsatisfactory until recently. With the introduction of radioactive isotopes for metabolic studies, it was natural that these agents should also have been used to review the thyroid functions. Iodine being an essential constitutent of the thyroid hormone was, therefore, selected for the purpose.

Of the two radioactive iodine compounds I^{130} (half life 12·5 hours) and I^{131} (half life 8 days), the latter was obviously more suitable for the purpose. The advantages of introducing radioactive iodine in such studies was that the body makes no distinction between the elemental iodine in its inert or radioactive state. Radioactive iodine emits beta and gamma radiations. It is, therefore, possible to trace the metabolism of iodine in the body by determining the movements of the radioactivity in and out of various sites. Samples of biological fluids taken from the body can easily be analysed by tracer technique for their radioactivity. The radio-iodine content of the thyroid gland can also be measured *in situ* by measuring the gamma radiations by suitable methods. With a little modification of the technique, the content of inorganic and organic iodine in the blood can be determined. All these in-

* A preliminary report.

vestigations can be checked at repeated intervals by comparatively simple methods and at little inconvenience to the patient. By such means a complete picture of the activity of the thyroid gland can be worked out.

On the basis of the thyroid functions mentioned above various tests for determining the thyroid activity have been devised. Some of these tests depend on the iodine accumulation qualities of the thyroid. These tests are carried out *in situ*, and as such have some sources of error inherent to the techniques used for determining radio-activity in the body by external counting. Besides, the rates are dependent on certain assumption made in the formulae that are applied. A better idea of the activity of the thyroid gland can be obtained by determining the radio-iodine clearance rates. In this test a theoretical quantity of blood cleared of iodine by the thyroid per minute is determined as in the familiar urea clearance test for kidney functions. Counts of samples of blood and over the thyroid are taken at various intervals and the rates can be very simply calculated.

Whereas the above tests are dependent on actual functions of the thyroid gland as determined directly, similar inference may be derived indirectly by urinary radio-iodine studies.

Although apparently these tests would give a very satisfactory idea about the activity of the thyroid gland with regard to its iodine metabolism, further consideration will make it clear that the total quantity of iodine taken up by the thyroid at any time, will depend not only on the state of its activity but also, to some extent, on the mass of the functioning gland tissue. Further, accumulation of inorganic iodine by the thyroid does not always run *pari passu* with its hormone-producing activity.

Simpler modifications of the detailed tests have also been introduced.

Material

Data on the iodine metabolism in human beings under the conditions prevalent in India were collected and the findings applied to the diagnosis of thyroid disease. Eighty-seven individuals both normals and those suffering from various thyroid disorders have been investigated by us.

Methods

In the absence of scintillation counting equipment the minimum dose of I^{131} that had to be administered to obtain a reliable counting rate was 25 μc. This amount is well below the safe permissible dose of I^{131} that can be given without causing a radiation hazard. The following observations were carried out:

(1) Percentage of iodine uptake by the thyroid over 24 hours.
(2) Plasma total and protein-bound iodine at 2 and 48 hours.
(3) Two and 24 hours urinary radio-iodine excretion.
(4) Salivary activity after 24 and 48 hours.

For determining the thyroid pick-up an end window G.M. tube (GEC Type CV-2138) was fitted inside a lead castle with the window alone exposed. The castle itself was mounted on an adjustable arm of an x-ray machine. The distance of the patient's neck from the window of the tube was kept at 20 cm. by means of a 1/8″ thick lead cylinder 3″ in diameter, fitted rigidly to the G.M. tube assembly. This cylinder, apart from giving a reproducible geometry, was effective in cutting off stray radiations from other parts of the body and the background.

To find the percentage pick-up it was first necessary to know the counting rate for a theoretical 100 per cent pick-up. For this 25 μc. of I^{131} in 50 ml. of water was taken in a 50 ml. volumetric flask and submerged in a 2L beaker filled with water. The distance between the counting tube and the front surface of the beaker was kept at 20 cm. by the use of the collimating cylinder mentioned above. The distance between the flask and the beaker was kept at 1 cm. The counting rate thus obtained was taken as 100 per cent. With this counting set up a rate of 258 counts per minute was obtained after allowing for the background.

To correct for counts from extra-thyroid radio-iodine present in the blood and in the tissue of the neck two methods were tried. Firstly, a count over the thigh was taken and this was subtracted from the counts taken over the neck. Secondly, the probable area of the thyroid gland was shielded by a lead plate supported just above the gland and counts of the exposed area taken. Pick-up values were determined at one hour, two hours, four hours, six hours, twenty-four hours and forty-eight hours after administration of the I^{131} dose.

Plasma radioactivity at 2 and 48 hours of administration of the dose was determined as follows: A 20 ml. sample of heparinized blood from the patient was centrifuged to separate the plasma. 2 ml. of this was plated on standard planchets with a few crystals of potassium iodide dried and counted with an end window G.M. tube (T.G.C.—2 Tracer Lab). Drying was con-

tinued till reproducible results were obtained. No advantage was obtained by taking more than 2 ml. of plasma due to self absorption by the sample. For determining the protein-bound-fraction 4 ml. of the plasma were treated with 20 per cent trichloracetic acid, the precipitated protein washed with 10 per cent T.C.A. and finally dissolved in 2N NaOH. Since statistically significant counting rates could not be obtained with the more convenient liquid G.M. counting, these protein solutions in NaOH were also dried on planchets like the plasma samples. 10 ml. of the urine samples passed after 2 hours was transferred directly to M 6 liquid counting tube (20th Century Electronic) and counted. For saliva counting 2 ml. of the sample were plated with KI on planchets and counted by the end window G.M. tube after drying.

It is preferable to count liquid samples with a scintillation counter, as for example, the liquid sample E.R.D. Scintillation counter which is over eight times as efficient as the G.M. counter.

Results

A few typical results obtained by us in our 87 cases are presented :

Euthyroid subject—Lac. M. (Case No. 22), a Madrasi young man aged 24, height 5'-6½" and weight 142 lb. He had no clinical evidence of thyroid enlargement or disordered functions of the gland. His pulse rate was 84 per minute and B.P. 124/80 mm. Hg. B.M.R. was +20.

Radio-iodine studies showed a thyroid uptake of 3·3 per cent and 26·6 per cent of the total dose administered at 2 hours and 24 hours respectively (normal values at 24 hours—19 to 53 per cent). His neck/thigh ratio was 0·22 corresponding to thyroid clearance of 8 ml. plasma/mt. Actual thyroid clearance was 10·8 ml. of plasma per minute (normal 7 to 42 ml./minute). His total and protein-bound activity at 48 hours was 0·184 per cent and 0·136 per cent of the dose per litre of plasma (normal at 48 hours : total plasma activity usually below 0·7 per cent and protein-bound activity normally below 0·5 per cent). Thus the radio-iodine tests confirmed normal thyroid functions in this individual (Fig. 1).

Hyperthyroidism—P.K.J. (Case No. 61), a male aged 33 years, was an obvious case of thyrotoxicosis. He gave a history of steady loss of weight (inspite of good appetite), palpitation and nervousness of several months' duration. Clinical examination showed a diffuse, moderate enlargement of the thyroid gland in the neck. His weight was 131 lb. and height 5'-6". The sleeping pulse rate was 92 per minute and blood pressure was 138/82 mm. Hg. B.M.R. was +30.

Radio-iodine studies showed a thyroid uptake of 69·29 per cent in one hour, 74·18 per cent in 2 hours and as much as 90·03 per cent of the total dose in 24 hours. His thyroid clearance values were 2472·6 ml. of plasma per minute. This was also obvious from his

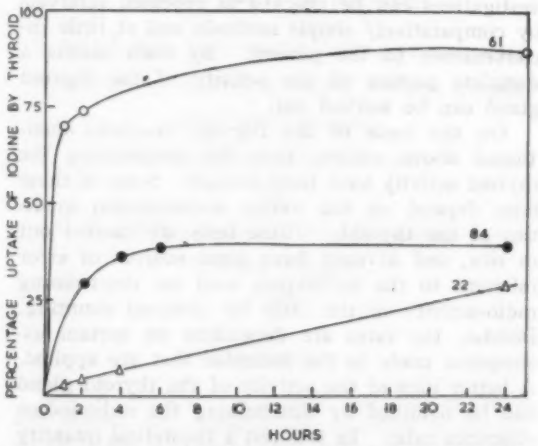


FIG. 1—SHOWING THE THYROID PICK UP, AS PERCENTAGE OF THE TRACER DOSE, IN NORMAL (CASES NO. 22 AND 84) AND HYPERTHYROID (CASE NO. 61) INDIVIDUALS.

neck/thigh ratio at one hour of 69·29 which corresponds to an almost infinite clearance value. His total plasma and protein-bound iodine values at forty-eight hours was 0·84 per cent and 0·84 per cent of dose per litre of plasma, i.e., the whole of radio-iodine present in the blood had presumably been completely converted into hormonal form. The study therefore clearly indicated that this was a gross case of thyrotoxicosis (Fig. 1).

Hyperthyroidism persisting after thyroidectomy—A. B. G. (Case No. 48), a male aged 24 years had a partial thyroidectomy in November 1952 and was still having some symptoms suggestive of a thyrotoxic state. On examination the isthmus and right lobe could be easily felt in the neck. He had a typical glitter of the eyes but no other eye signs. His weight was 138 lb. and height 5'-11". Sleeping pulse rate was 88 per minute and B.P. 140/84 mm. Hg. B.M.R. was +10.

Radio-iodine studies showed a thyroid uptake at two hours of 23 per cent and 24 hours 51·5 per cent of the tracer dose. Neck/thigh ratio was 7 which corresponds to a thyroid clearance of 100 ml. of plasma per minute. Actual thyroid clearance showed the values to be 101·6 ml. per minute. His total plasma and protein-bound radio-iodine values were 0·224 per cent and 0·094 per cent of the total dose per litre. On the whole the tests reveal persistence of toxicity. Plasma radio-iodine values were however not confirmatory.

Diffuse thyroid enlargement with suspected toxicity—Miss M.M. (Case No. 84), an Anglo-Indian female aged 34 years was referred to us by her doctor as a suspected case of thyrotoxicosis. She had been suffering from nervousness and apprehension for several months, had lost a little weight and had a normal appetite. She was vivacious and easily excitable. Rather thin, 5'-2½" in height with a weight of 101 lb. Her resting pulse rate was 84 per minute and B.P. 104/72 mm. Hg. She had a slight glitter of the eyes and a diffuse enlargement of the whole thyroid gland. No other signs of toxicity were present. B.M.R. was +10.

Radio-iodine studies showed a thyroid uptake of 15·3 per cent and 32·8 per cent at two hours and twenty-four hours respectively. Her neck/thigh ratio was 1·8 corresponding to a thyroid clearance value of about 30 to 50 ml. of plasma per minute. Actual thyroid clearance values were 49 ml. per minute. Total plasma iodine and protein-bound iodine values at two hours were 5·284 per cent and 0·44 per cent and at 48 hours 0·388 per cent and 0·144 per cent of the tracer dose per litre of plasma. All these findings confirmed that she was a case of simple diffuse, goitre and functionally normal. (Fig. 1).

SUMMARY

I^{131}, with a half life of 8 days, has been used by us in a study of 87 individuals. The methods employed have been described.

Some typical results obtained in normal obvious hyperthyroid and doubtful cases have been described.

ACKNOWLEDGMENTS

We wish to record our thanks to Prof. G. I. Finch, Director National Chemical Laboratory but for whose help, encouragement and guidance this work would not be possible.

We also wish to thank Col. K. S. R. Menon of Military Hospital, Poona, for his ready co-operation and the D.M.S. (Army) for permission to publish this paper.

Our thanks are also due to the staff of Tracer Laboratory of the National Chemical Laboratory and Medical Division, Military Hospital, Poona for their help and the various civilian doctors in Poona for referring their patients to us for study.

HAEMOGLOBIN VALUES OF SCHOOL BOYS IN UTTAR PRADESH

K. K. GOVIL, M.B.B.S., D.P.H., D.T.M., C.N., P.H.S.

AND

K. C. PANT, M.SC.

Provincial Hygiene Institute, Lucknow

Haemoglobin estimations of school children have been carried out in various parts of India particularly from the rice-eating populations of Bengal, South India and Nilgiris (Napier and Das Gupta, 1940 ; Bhave and Bopaiya, 1942 and Patwardhan, 1951-52). In U.P. while undertaking rapid nutrition survey according to the schedule recommended by the Nutrition Advisory Committee, Indian Council of Medical Research, haemoglobin estimation of 931 boys between 6-19 years of age was made during the period of from August 1952 to March 1953 in various schools situated in the urban and rural areas of four districts of Uttar Pradesh. They were selected at random and represented practically all the castes and socio-economic groups which are ordinarily resident in the State. Boys who appeared to be sick were not included in the survey. Haemoglobin was estimated with a Farbstab haemometer, according to the method described by Napier and Das Gupta (1945). With this method the normal values in adults were as follows :

		Hb. in g. per cent
Male	(a) Average	16·0
	(b) Range of variation	14·0 to 18·0
Female	(a) Average	14·5
	(b) Range of variation	13·0 to 16·5

In the present survey thirty to thirty-five estimations were made in a day and all the readings were taken by the same observer to reduce the chances of variability. Along with the haemoglobin values, the data about age, height and weight were also collected, under conditions described previously (Govil, 1952) to see if any correlation existed between age, height, weight and haemoglobin. Table 1 gives the mean haemoglobin values at different age groups of U.P. school boys together with average height and weight. A comparative statement of haemoglobin values in different places in India is given in Table 2.

Tables 1 and 2 show that the findings of the present survey are similar to those of other workers, in the sense that the haemoglobin level has slight gradual upward tendency from a lower to the adolescent ages. It appears to be correlated positively with the age. Statistical analysis of the data is given in Table 1.

DISCUSSION

The results of dietary surveys carried out in school boys in Uttar Pradesh (Govil *et al*, 1953) showed that the diets were generally composed of cereal foods and pulses. They lacked in milk, green leafy vegetables, fruits, meat and other protective foods rich in nutrients essential for adequate nutrition. The values obtained for iron, calculated according to the food tables in Field Service Hygiene Notes India (1945) were found to be between 29·7 mg. and 57·8 mg. per consumption unit per day. The supply of iron required by the healthy body varies greatly with age and sex. From birth to puberty it is required for growth. Various workers in India have shown, that leaving aside infections like chronic malaria and ankylostomiasis, etc., the most important cause of anae-

TABLE 1—SHOWING THE MEAN HAEMOGLOBIN VALUES AT DIFFERENT AGES OF U.P. SCHOOL BOYS TOGETHER WITH AVERAGE HEIGHT AND WEIGHT TREATED STATISTICALLY

Age in years	Total No. in group	Mean haemoglobin in g. per 100 c.c. of blood	Standard deviation	Mean weight in lb.	Standard deviation	Mean height in inches	Standard deviation	Correlation between haemoglobin and	
								Weight	Height
6	9	13·91	±1·330	43·2	± 5·087	45·7	±2·260	+0·330	+0·550
7	10	13·81	±1·113	46·0	± 4·520	48·1	±2·370	+0·015	+0·350
8	44	13·85	±1·122	49·6	± 8·310	49·9	±3·557	+0·235	+0·230
9	88	13·94	±1·072	51·5	± 8·472	50·6	±3·246	+0·270	−0·150
10	113	14·13	±1·021	58·1	±10·326	52·6	±3·124	+0·281	+0·246
11	163	14·04	±0·987	58·9	±13·453	53·8	±3·243	+0·413	+0·324
12	124	14·02	±0·973	64·5	±14·236	55·6	±3·343	+0·454	+0·224
13	133	14·43	±1·347	74·7	±15·990	58·2	±4·352	+0·468	+0·433
14	98	14·30	±1·663	80·2	±14·500	59·4	±4·432	+0·443	+0·524
15	64	14·88	±0·894	86·7	±16·516	61·7	±4·019	+0·740	+0·612
16	42	14·68	±1·642	93·8	±18·785	63·1	±4·245	+0·426	+0·394
17	30	15·14	±1·533	97·2	±12·160	63·1	±2·293	+0·380	+0·932
18	8	15·12	±1·594	101·2	±12·153	63·6	±1·891	+0·508	−0·006
19	5	15·00	±1·297	105·8	± 4·749	66·0	±3·112	+0·733	+0·245
	931								

TABLE 2—SHOWING COMPARATIVE HAEMOGLOBIN VALUES AT DIFFERENT AGES IN DIFFERENT PLACES IN INDIA

Age in years	Mean haemoglobin in g. per 100 c.c. of blood				
	School boys in U.P.	Boys of Nilgiris (Patwardhan, 1951-52)	Sikh boys in Calcutta (Napier & Das Gupta, 1940)	School boys of Hindu middle class families of Calcutta (Napier & Das Gupta, 1940)	School children of Coorg (Bhave & Bopaiya, 1942)
6	13·91	12·55	11·40	—	Average figures were approximately the same with the age group 5-12 years and no difference between boys and girls was observed. The values ranged from 9·07 gm. to 10·87 gm. of haemoglobin per 100 c.c. of blood
7	13·81	12·27	11·69	—	
8	13·85	12·32	12·29	12·11	
9	13·94	12·72	11·79	12·06	
10	14·13	12·72	11·97	11·89	
11	14·04	12·83	12·12	12·46	
12	14·02	12·68	12·50	12·41	
13	14·43	12·79	12·90	12·59	
14	14·30	12·85	12·90	13·10	
15	14·88	13·25	—	13·30	
16	14·68	13·29	13·34	13·39	
17	15·14	14·02			
18	15·12	14·58			
19	15·00	14·51			

mia is the deficiency of 'available' iron in the diets and that haemoglobin values increase appreciably on iron administration in subjects living on a low iron intake.

Ranganathan (1938) analysed Indian food stuffs for their 'available' iron by a chemical method involving the use of a-a′ dipyridyle. The foodstuffs analysed were found to vary widely as regards the percentage of total iron 'available'. A fairly high percentage of the iron in cereals, pulses and meat is available, but a lower percentage of the iron in vegetables. Biological tests are more trustworthy than chemical ones. It has been shown that there is little parallelism between the dipyridyl value and the true availability of iron tested by animal experiments. In the present state of our knowledge, the only safe procedure, appears to be, to allow a good margin of safety. A total iron intake of 10-30 mg. as recommended by the Nutrition Advisory Committee, Indian Council of Medical Research daily from all foods present in the diet of children and adolescents should provide the body with sufficient iron for its needs. The intake of iron in the dietaries of U.P. school boys mostly obtained from pulses, wheat and other cereals was adequate, with the result that the haemoglobin values of school boys in U.P. were found to be satisfactory. Khanna and Sachdev (1946) found the mean haemoglobin value of healthy normal medical students between 18-26 years of age, of Lahore (Punjab) as $14{\cdot}78 \pm 1{\cdot}29$.

The present survey included school boys only between the ages 6 and 19 years. The haemoglobin values in younger boys were lower than those accepted as normal for healthy adults. They showed a gradual increase with the increase of age.

Summary

In a survey of 931 school boys in Uttar Pradesh the haemoglobin curve showed, generally, a gradual increase in the average haemoglobin values with the increase of age from about 13·91 g. at the age of six years to about 15·00 g. at nineteen years. The haemoglobin values of younger boys were lower than those accepted as normal for healthy adults. A distinct correlation of haemoglobin level with both weight and height was noticed. The haemoglobin figures were found satisfactory and were due to an adequate intake of iron in their diets.

Acknowledgment

Our thanks are due to the Director of Medical and Health Services, U.P., Lucknow, for permission to publish the results of survey.

References

Bhave, P. D. and Bopaiya, M. S.—*Indian J. M. Research*, **30** : 53, 1942.

Field Service Hygiene Notes, India—Medical Directorate Indian Army, 1945.

Govil, K. K.—*Indian M. Gaz.*, **87** : 567, 1952.

Govil, K. K., Mitra, D. and Pant, K. C.—*Indian M. Gaz.*, **88** : 357, 1953.

Khanna, L. C. and Sachdev, J. C.—*Indian M. Gaz.*, **81** : 296, 1946.

Napier, L. E. and Das Gupta, C. R.—*Indian J. M. Research*, **28** : 207, 1940.

Idem—Haematological Technique, 1945. Thacker Spink & Co. Ltd., Calcutta.

Patwardhan, V. N.—(1951-52). (Unpublished).

Ranganathan, S.—*Indian J. M. Research*, **25** : 677, 1938.

HAEMATOLOGICAL VALUES AND THEIR VARIATIONS AMONGST RESIDENTS OF ASSAM

B. BANERJEE, M.SC., M.B., B.S., D.PHIL.*

Department of Physiology, Assam Medical College Dibrugarh, Assam

Introduction

Due to various socio-economic, racial and climatic factors, the average values of R.B.C. and W.B.C. of people residing in tropical countries may not entirely agree with those of the Western people and as such there is a pressing need for the establishment of average standard of the various factors of blood in tropical countries. Investigations have been carried out in India from time to time (Sankaran and Rajagopal, 1936 ; Napier and Dasgupta, 1945 ; Ramlingaswamy and Venkatachalan, 1950 ; Mukherjee and Ghosh, 1951 ; Dasgupta and Chandrasekhar, 1952 ; Mohan Singh *et al*, 1953 ; Banerjee, 1957). The present investigation was undertaken to find the local averages, their seasonal variations and other peculiarities, if any.

Materials and Method

In winter, 131 male and 75 female subjects and in summer 63 male and 43 female subjects of age group 18 to 24 years were investigated. From the above group, 63 male and 25 female subjects were examined both in summer and winter. In addition, in summer, 48 officers, 45 skilled labourers and 34 Indian soldiers of age group 25 to 40 years were also investigated. These were all normal subjects, regular in their attendance of

* Now Professor of Physiology, Christian Medical College, Ludhiana (Punjab).

daily duties. None had any complaint and physical examination revealed no abnormality. Their diet survey was done and was found to be satisfactory (Banerjee, 1957).

The following investigations were made:

i. Estimation of haemoglobin (Hb.).

ii. Enumeration of total red blood cells (R.B.C.).

iii. Determination of erythrocytic sedimentation rate (E.S.R.).

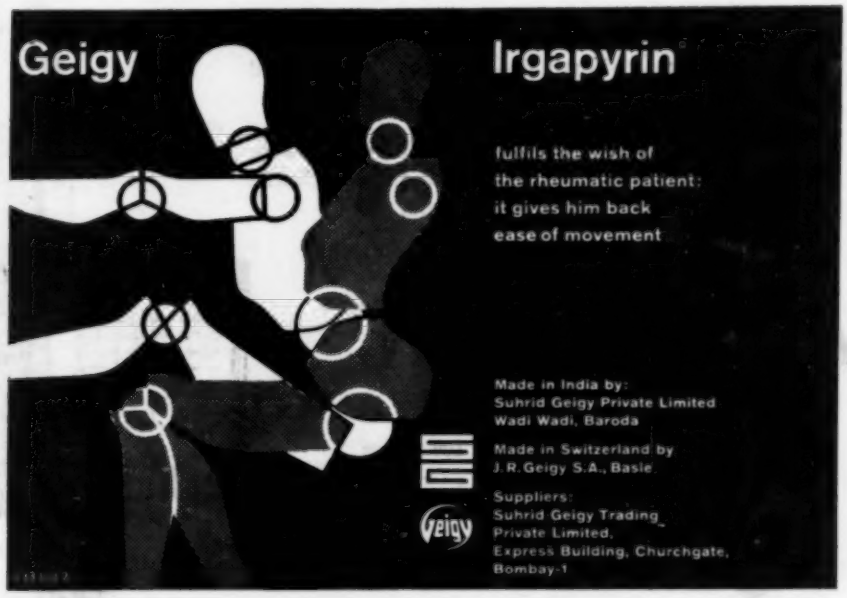
iv. Determination of packed cell volume (P.C.V.).

v. Enumeration of total white blood cells (W.B.C.).

5 c.c. fasting venous blood from each subject was collected in dry vial containing 10 mg. of a mixture of ammonium and potassium oxalates in the proportion of 6:4. The standard routine methods as described and adopted by Napier and Dasgupta (*loc. cit.*) were followed. For the investigation of female subjects menstrual period with five days on either side was avoided.

TABLE 1A—SHOWING THE MEAN, STANDARD DEVIATION, RANGE AND PROBABLE ERROR OF VARIOUS HAEMATOLOGICAL FINDINGS IN DIFFERENT CATEGORIES OF SUBJECTS IN WINTER AND SUMMER

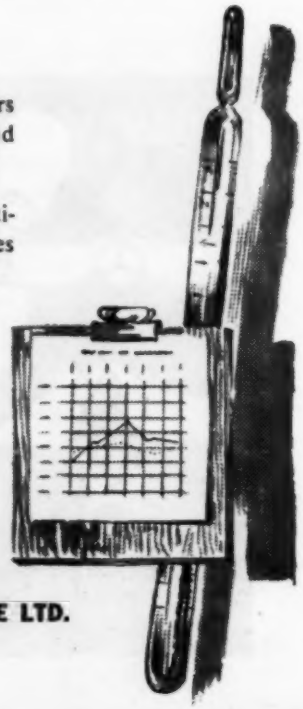
Category of subject with age range (years).	No. investigated	Total R.B.C. (mill per c.mm.)	Hb. (g. per cent)	P.C.V. (per cent)	E.S.R. (mm. 1st hr.)	Calculated M.C.V. (cubic micron)	Calculated M.C.H. (micro-micro grams)	Calculated M.C.H.C. (per cent)	Total W.B.C. (thousand per c.mm.)
				WINTER					
Male 18 to 24	131	5·05	14·7	44·5	9·25	89	29·4	33	6·45
		±0·5	±1·0	±3·2	±7·5				±1·3
		3·5 - 6·4	11 - 16·9	35 - 52	0 - 39				3·5 - 10·4
		±·03	±·06	±·2	±·45				±·08
Female 18 to 24	75	4·2	12·12	39·04	26	93	28·8	31	6·61
		±0·38	±1·0	±3·4	±10				±1·6
		3 - 5·4	10 - 14·9	29 - 46	0 - 49				3·5 - 10·4
		±·03	±·07	±·26	±·78				±·12
				SUMMER					
Male 18 to 24	63	4·81	14·44	46·5	15·0	97	30·7	31	6·17
		±0·49	±1·25	±3·4	±8·5				±1·15
		3 - 5·9	11 - 16·9	37 - 52	0 - 34				4 - 9·4
		±·042	±·105	±·28	±·71				±·09
Female 18 to 24	43	4·065	12·85	39·1	28·5	96	31·1	32·8	6·45
		±0·325	±1·15	±3·0	±8·5				±1·45
		3 - 4·9	10 - 14·9	31 - 46	5 - 49				4 - 10·4
		±·03	±·1	±·3	±·9				±·14
Officers 25 to 40	48	5·135	15·135	46·4	17	90·3	29·4	32·6	6·28
		±0·37	±0·9	±3·6	±10				±1·045
		4 - 6·4	13 - 16·9	37 - 52	0 - 44				4 - 8·4
		±·03	±·08	±·3	±·96				±·096
Skilled labourers 25 to 40	45	4·58	14·2	42·1	20·05	91·9	31	33·7	5·85
		±0·55	±1·2	±4·2	±10·5				±1·45
		3 - 5·9	11 - 16·4	33 - 52	0 - 49				4 - 9·9
		±·05	±·12	±·4	±1·1				±·14
Army personnel 25 to 40	34	5·3	15·9	47·82	12·5	90·2	30	33·2	6·45
		±0·45	±1·15	±2·8	±8·65				±1
		4 - 6·4	13·5 - 18·4	41 - 54	0 - 34				4·5 - 8·9
		±·05	±·13	±·3	±1·0				±·11


Geigy
Irgapyrin
fulfils the wish of
the rheumatic patient:
it gives him back
ease of movement
Made in India by:
Suhrid Geigy Private Limited
Wadi Wadi, Baroda
Made in Switzerland by
J.R.Geigy S.A., Basle
Suppliers:
Suhrid Geigy Trading
Private Limited,
Express Building, Churchgate,
Bombay-1
Geigy

more prompt control of Diarrhoeas
uneomycin
WITH NEOMYCIN compd.
ANTI-INFECTIVE • ANTI-ALLERGIC • ADSORBENT
DUAL ACTION
Chloramphenicol + Vitamins fortified
unimycetin-vf
combats pathogenic organisms
fortifies body defences
UNICHEM
UNICHEM LABORATORIES
BOMBAY 26

Chloramphenicol—Antibiotic, Vitamin B Complex factors —Anti Stress, Vitamin C—Promotes Healing and Vitamin K—Anti Haemorrhagic.

Counteracts infection—Increases the efficacy of the antibiotic—Counteracts the sub-clinical Vitamin deficiencies —Minimises the incidence of side effects.

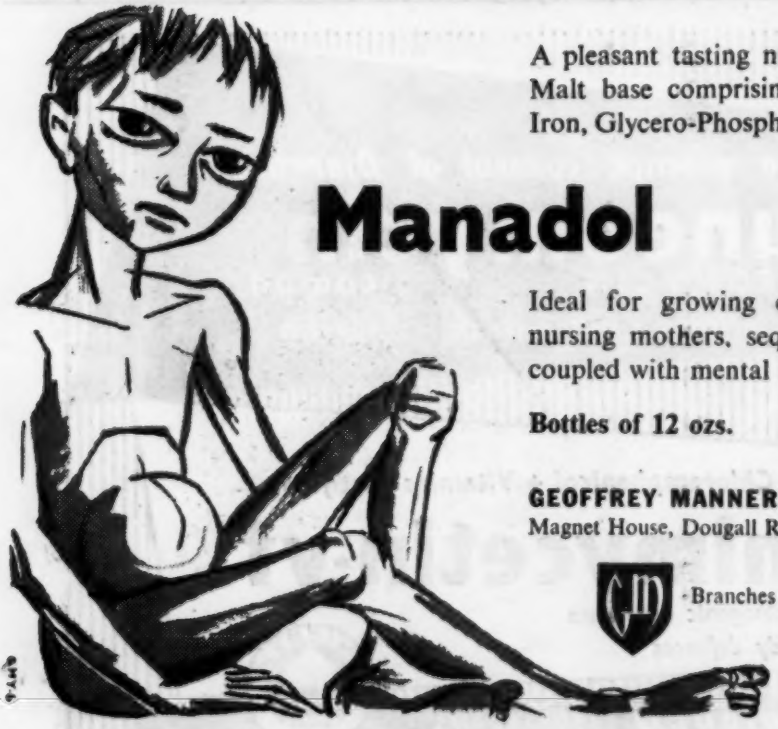


VITAMYCETIN

Bottles of 12 tablets • Bottles of 100 tablets

GEOFFREY MANNERS & CO. PRIVATE LTD.
Magnet House, Dougall Road, Bombay 1
Branches: **Calcutta • Delhi • Madras**

GMV-3



A pleasant tasting nutritional supplement in Malt base comprising of essential vitamins, Iron, Glycero-Phosphates and Glutamic Acid.

Manadol

Ideal for growing children, pregnant and nursing mothers, sequelae of chronic illness coupled with mental retardation.

Bottles of 12 ozs.

GEOFFREY MANNERS & CO. PRIVATE LTD.
Magnet House, Dougall Road. Bombay 1

Branches: **Calcutta • Delhi • Madras**

TABLE 1B—SHOWING THE MEAN, STANDARD DEVIATION, RANGE AND PROBABLE ERROR OF DIFFERENT HAEMATOLOGICAL FACTORS OF 63 MALE AND 25 FEMALE SUBJECTS WHO REPORTED BOTH IN WINTER AND SUMMER

Category of subject with age range in years	No. investigated	R.B.C. (mill c.mm.)	Hb (g. per cent)	P.C.V. (per cent)	E.S.R. (mm. 1st hr.)	M.C.V. (cubic micron)	M.C.H. (micro-micro gram)	M.C.H.C. (per cent)	W.B.C. (thousand per c.mm.)
				WINTER					
Male 18 to 24	63	5·05	14·56	44·4	9	88	29	33	6·565
		±·45	±1·05	±3·2	±7				±1·25
		3·5 - 6·4	11 - 16·9	35 - 52	0 - 39				3·5 - 9·9
		±·038	±·054	±·38	±·59				±·1
Female 18 to 24	25	4·11	12·21	39·92	27·9	97	30	31	6·31
		±·39	±1·1	±3·6	±10·5				±1·4
		3 - 49	10 - 14·9	30 - 46	5 - 49				3·5 - 9·4
		±·05	±·14	±·48	±1·4				±·18
				SUMMER					
Male 18 to 24	63	4·81	14·44	46·5	15·5	97	30	31	6·175
		±·5	±1·25	±3·4	±8·5				±1·15
		3 - 5·9	11 - 16·9	37 - 52	0 - 34				4 - 9·4
		±·042	±·105	±·28	±·71				±·09
Female 18 to 24	25	4·05	12·89	39·36	27·9	98	32	33	6·39
		±28	±1·15	±3·4	±9				±1·4
		3·5 - 49	10 - 14·9	31 - 46	5 - 49				4 - 8·9
		±·03	±·14	±·45	±1·2				±·18

Calculations were done to find out (i) the mean (M), standard deviation (SD) and probable error (PE) of the above factors in all the categories of subjects, (ii) the co-efficient of correlation of R.B.C. and haemoglobin, E.S.R. and serum globulin and serum albumin and R.B.C. of all the categories and (iii) the significance of variation of the above factors due to season, age, sex, and occupation.

RESULTS

Table 1A shows the mean with standard deviation, range and probable error of R.B.C., Hb., E.S.R., P.C.V. and W.B.C. and mean values of M.C.V., M.C.H. and M.C.H.C. of the above categories of subjects in winter and summer. Table 1B shows the same for 63 male and 25 female subjects who reported both in winter and summer.

Table 2 shows the co-efficient of correlation of R.B.C. and Hb., and E.S.R. and serum globulin, and serum albumin and R.B.C. of all the categories of subjects under investigation.

TABLE 2—SHOWING THE CO-EFFICIENT OF CORRELATION "r"

Category of subject with age range in years	Total No. investigated in winter and summer	"r" of R.B.C. and Hb.	"r" of E.S.R. and serum globulin	"r" of R.B.C. and serum albumin
Male, 18 to 24 ...	194	0·4860	0·225	0·0054
Female, 18 to 24 ...	118	0·15954	0·24073	0·06968
Officers, 25 to 40 ...	48	0·5607	0·4921	0·07389
Skilled labourers, 25 to 40 ...	45	0·59	0·55300	0·0396
Army personnel, 25 to 40 ...	34	0·61496	0·21	0·0258

Figures 1 to 5 show in histogram form the frequency distribution of R.B.C., Hb., P.C.V., E.S.R. and W.B.C. of all the categories of subjects under investigation.

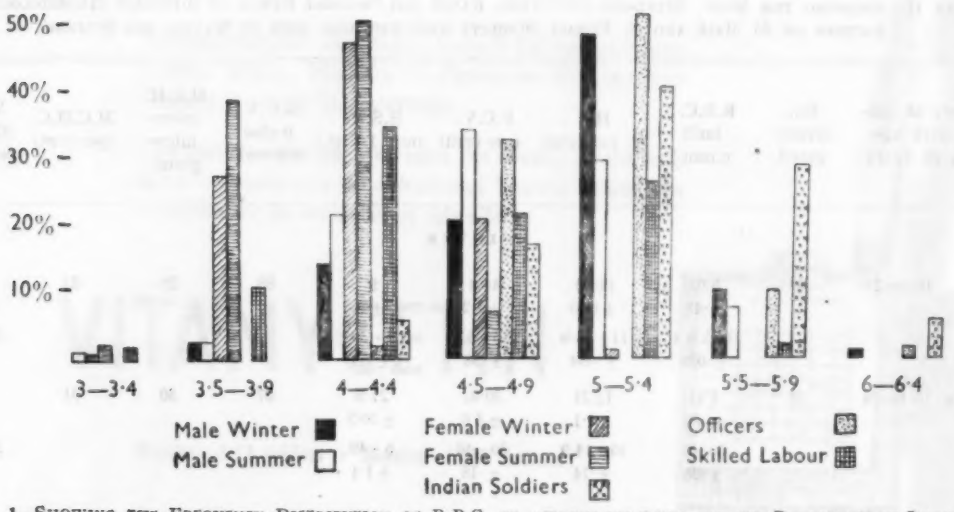


FIG. 1—SHOWING THE FREQUENCY DISTRIBUTION OF R.B.C. IN MILLION PER C.MM. AND THE PERCENTAGE OF SUBJECTS.

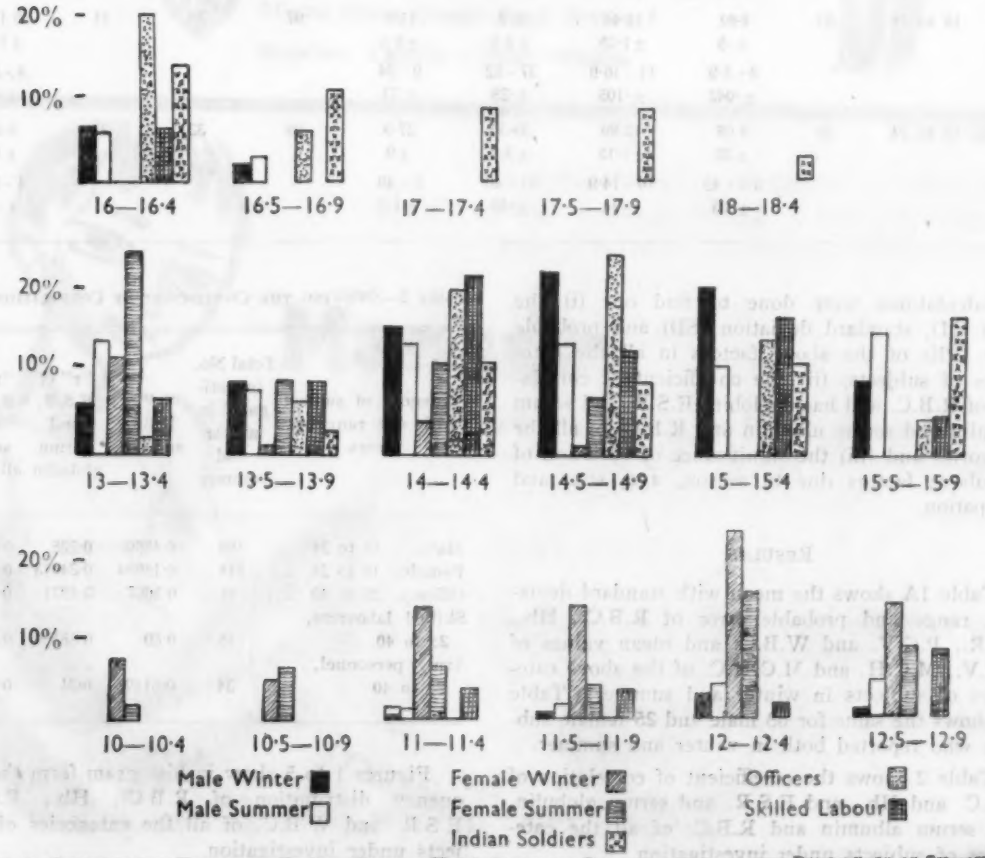


FIG. 2—SHOWING THE FREQUENCY DISTRIBUTION OF HAEMOGLOBIN IN GRAM PER CENT AND THE PERCENTAGE OF SUBJECTS.

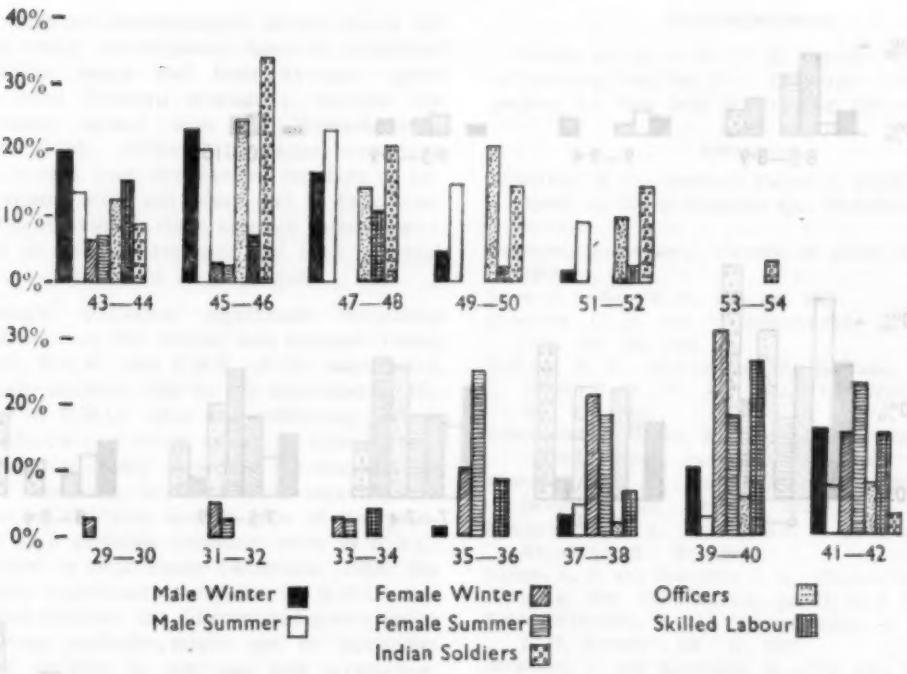


FIG. 3—SHOWING THE FREQUENCY DISTRIBUTION OF P.C.V. IN PER CENT AND THE PERCENTAGE OF SUBJECTS.

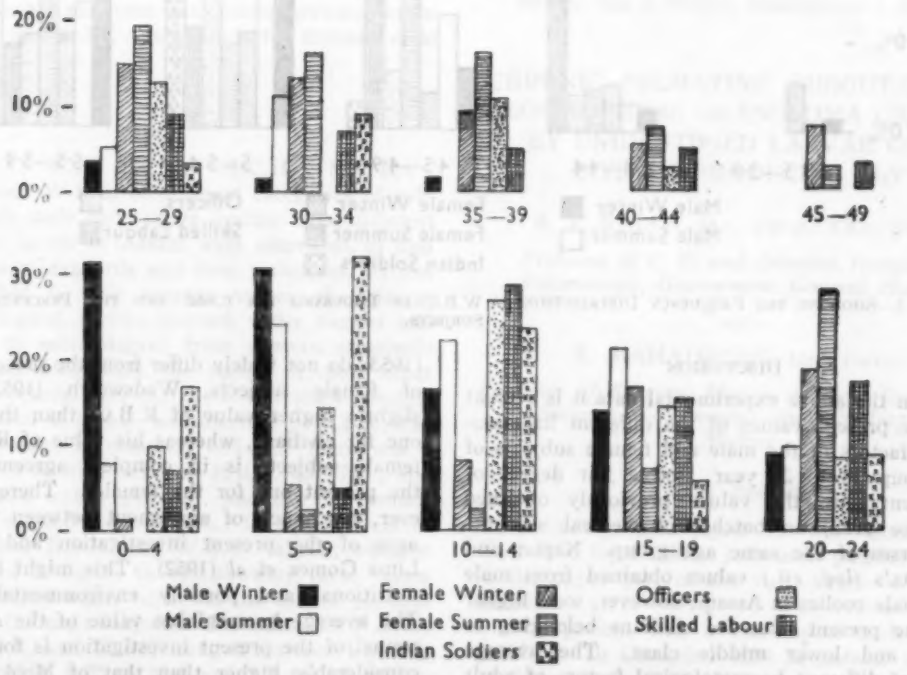


FIG. 4—SHOWING THE FREQUENCY DISTRIBUTION OF E.S.R. IN MM./1ST HOUR AND THE PERCENTAGE OF SUBJECTS.

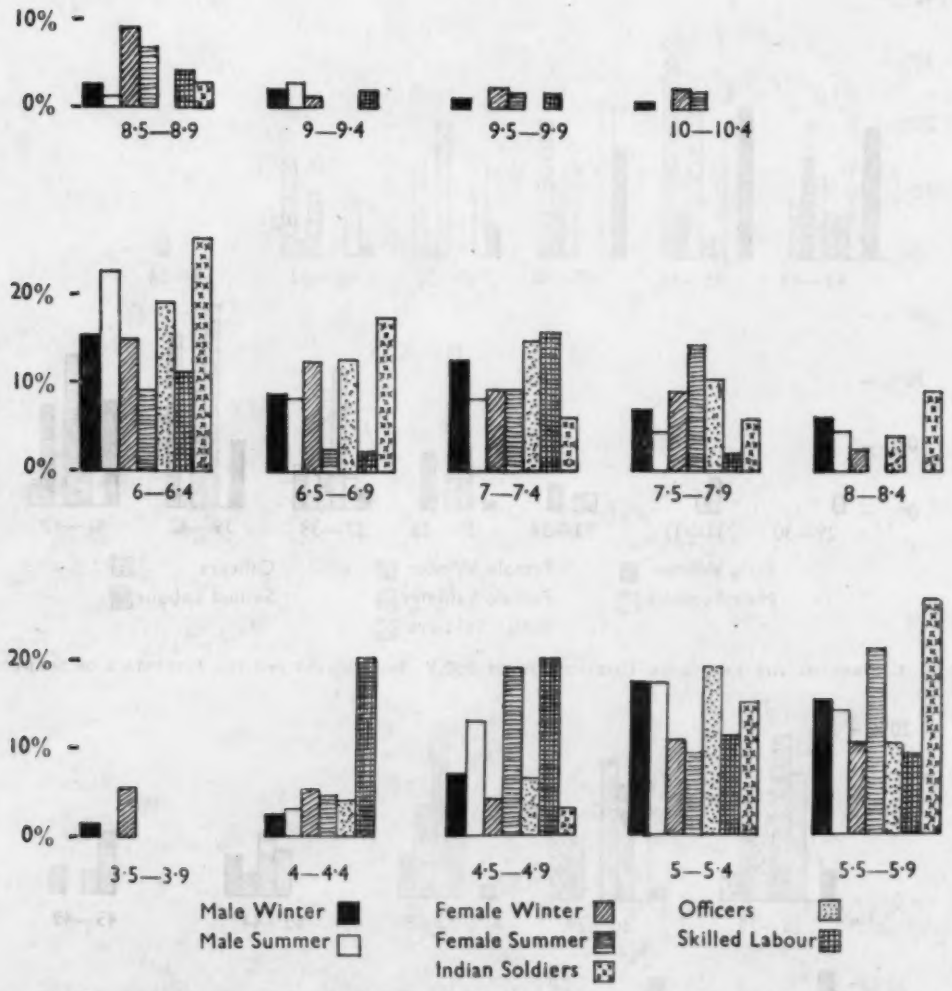


FIG. 5—SHOWING THE FREQUENCY DISTRIBUTION OF W.B.C. IN THOUSAND PER C.MM. AND THE PERCENTAGE OF SUBJECTS.

DISCUSSION

From the above experimental data it is evident that the present values of the different haematological factors of the male and female subjects of age group 18 to 24 year, find a fair degree of agreement with the values previously obtained (Banerjee 1953) on batches of medical students and nurses of the same age group. Napier and Dasgupta's (*loc. cit.*) values obtained from male and female coolies in Assam, however, were higher than the present ones for civilians belonging to middle and lower middle class. The average values of different haematological factors of adult Punjabi women obtained by Mohan Singh *et al* (1953) do not widely differ from the present values of female subjects. Wadsworth (1952) found slightly higher value of R.B.C. than the present one for civilians, whereas his value of R.B.C. for female subjects is in complete agreement with the present one for the females. There is, however, not much of agreement between the averages of the present investigation and those of Lima Gomez *et al* (1952). This might be due to nutritional and possibly environmental factors. The average haemoglobin value of the army personnel of the present investigation is found to be considerably higher than that of Mookerjee and Ghosh (1951) on a batch of Indian troops.

The different haematological factors of all the civilians under investigation however presented much wider range and their average values differed from Western averages; whereas the army values agreed with the Western ones (Albritton, 1953). Although the ranges were very wide as is seen from the figures, numbers of extreme variants were not many and as they were all healthy individuals these extreme variants were included to find the averages and their seasonal and other variations of each category.

Although statistical significant variations occurred between the winter and summer values of R.B.C., P.C.V. and E.S.R. of the same batch of 63 male subjects, due to the smallness of the difference of R.B.C. value and conflicting pattern of the difference in other values no definite conclusion can be drawn regarding the seasonal influence. Similarly, as there were superimposed variations of nutrition and in view of the possibility of high probable minimum error in R.B.C. counts even in best hands (Wintrobe, 1952) the statistically significant variations of R.B.C. and Hb. values between the different categories under investigation probably might not be justifiably attributed entirely to sex, age and occupation. There was, however, positive correlation between R.B.C. and Hb., and E.S.R. and serum globulin but no such correlation was noticed between serum albumin and R.B.C. as claimed by Holmes *et al* (1952).

Summary

R.B.C., Hb., P.C.V., M.C.H., M.C.H.C., E.S.R. and W.B.C. of different categories of subjects both male and female coming from different economic levels in Assam were estimated to find the average standards and their variations. It was found that (i) the average values of different haematological factors showed wider ranges and differed to some degree from western standards though agreeing with the values of most other Indian workers, and (ii) there was slight decline in the value of R.B.C. and increase in E.S.R. and P.C.V. values in summer, and (iii) there was a positive co-relation between R.B.C. and Hb., and E.S.R. and serum globulin, and (iv) the female subjects showed the lowest R.B.C. and Hb. values and highest E.S.R. and W.B.C. values; whereas the skilled labourers though showing these values higher than females occupied the lowest position amongst the male subjects. The values for R.B.C., Hb., E.S.R. and W.B.C. ranged between 4 to 5·3, 12·12 to 15·9, 9·25 to 28·5 and 5·8 to 6·6 respectively.

Acknowledgments

Thanks are due to Dr. N. H. Hazarika, Demonstrator of Physiology and Sri P. C. Chatterjee, College Photographer, for their help in preparing the histograms.

References

Albritton, E. C.—Standard Values in Blood, 1953, Published by W. B. Saunders Co., Philadelphia, pp. 37 & 51.

Banerjee, B.—*Indian J. Physiol. & Allied Sc.*, **7**: 175, 1953.

Idem—J. Indian M. A., **29**: 280, 1957.

Dasgupta, C. R. and Chandrasekhar, C.—*Indian M. Gaz.*, **87**: 95, 1952.

Holmes, E. G., Stanier, M. W., Semambo, Y. B. and Jones, E. R.—*Tr. Roy. Soc. Trop. Med. & Hyg.*, **45**: 371, 1952.

Limagomes, C. Wusni, R. Zepata, C. and Hernendez, E. —*Arch. venezol. Nutrition*, **3**: 99, 1952.

Mohan Singh, M., Kapoor, S. P. and Singh, G.—*Indian M. Gaz.*, **88**: 316, 1953.

Mookherjee, G. C. and Ghosh, B. K.—*Indian J. M. Research*, **25**: 741, 1951.

Napier, L. E. and Dasgupta, C. R.—Haematological Technique, 1945, Third Edition, pp. 17, 21 & 23.

Ramalingaswamy, V. and Venkatachalan, P. B.—*Indian J. M. Research*, **38**: 17, 1950.

Sankaran, G. and Rajagopal, K.—*Ibid*, **25**: 741, 1938.

Wadsworth, G. R.—*M. J. Malaya*, **7**: 104, 1952.

Wintrobe, M. M.—Clinical Haematology, 1952, Third Edition, Lea & Febiger, Philadelphia, p. 314.

CHRONIC MIGRATING SUBCUTANEOUS EOSINOPHILIC GRANULOMA CAUSED BY UNIDENTIFIED LARVAE OF A MYIASIS-PRODUCING FLY

R. V. RAJAM, M.S., F.R.C.P., F.R.S. (EDIN.)

Professor of V. D. and Director, Institute of Venereology, Government General Hospital

AND

R. MAHADEVAN, M.S., F.R.C.S.

Professor of Surgery, Madras Medical College and Surgeon, Government General Hospital Madras

Case Report

An adult male aged 44 was admitted on 19-12-1956 for a diffuse indurated painful swelling in the upper part of the right thigh of 2 years' duration.

The patient was a diabetic of undetermined duration. In December 1954 he noticed a painful swelling, the size of a lime, on the upper part of the right thigh. Ten days later, another similar

painful swelling appeared an inch and a half above and to the lateral aspect of the first swelling with apparently normal skin between the two swellings. The second swelling in a few days became red, soft, fluctuant and burst spontaneously. He was treated with insulin, penicillin and local dressings, but the discharging sinus and the indurated first swelling persisted for about 2 months. They were stated to have subsided and healed with local infiltration with aqueous penicillin. A month later, a third indurated painful swelling appeared 2" above the level of the second lesion which remained healed. This was in turn incised and a small quantity of blood stained pus was evacuated. While the patient was receiving insulin, a broad spectrum antibiotic and local dressings the sinus failed to heal, the edges of the wound were getting indurated and the area of the upper part of the thigh in contiguity with the sinus, was developing a slowly increasing painful brawny swelling. The incision ultimately healed after 3 months, but the brawny induration persisted for about 6 months. Infra-red and ultraviolet ray therapy were tried in succession for about a month without much relief. For the first time a biopsy of the indurated lesion was examined in a district hospital and was reported as of tuberculous aetiology. Ambistryn was administered for 15 days at the rate of 1 g. daily, but no improvement was noticed. In June 1956, the brawny swelling covered an area of the outstretched palm on the anterior and inner aspect of the thigh at the junction of the upper and middle thirds. A course of deep x-ray therapy was given in the district hospital. The swelling gradually subsided over a period of 8 months, only to reappear lower down on the middle third of the thigh and gradually encircling the limb.

Clinical Examination at the Time of Admission

On examination the patient was a poorly nourished individual, febrile and appeared to be in great pain. He was not able to use his right lower extremity. There was a tender extensive brawny induration warm to the touch, slightly dusky in colour involving the anterior, medial and lateral aspects of the middle third of the right thigh about 5 inches in vertical extent, with a clearly visible erythematous advancing lower edge, almost encircling the limb horizontally. The overlying skin was taut, shiny and fixed to the underlying induration which appeared to have involved the deeper tissues. The area of induration, was slightly raised above the surrounding area both above and below. There were three vertically placed scars on the anterior and outer aspect of the upper third of the thigh and the surrounding skin and subcutaneous tissue felt woody but nontender. The inguinal glands on the right side were just palpable. Except for a febrile pulse, the cardiovascular and other systems were normal.

Laboratory Investigations

Urine—Urine showed presence of sugar only.

Blood—Haemoglobin—84 per cent, R.B.C.—3·7 million per cmm., W.B.C.—10,600 per cmm. with polymorphs 82 per cent, lymphocytes 14 per cent and eosinophils 4 per cent. Erythrocyte sedimentation rate was 60 mm. in 1 hour (Westergren). Blood VDRL test was negative for syphilis.

Glucose tolerance test showed a fasting blood sugar level of 250 mg. per cent with 444 mg. per cent rise at the end of two hours.

Biopsy—On 27-12-1956 a biopsy was taken from the anterior aspect of the lesion as near the growing edge as possible. The pathologist reported as follows: "The dermal connective tissue is infiltrated with a dense collection of eosinophils and neutrophils. There is perivasculitis and endovasculitis. A few lymphocytes and monocytes are also found in the same area. The appearance is suggestive of helminthic infection although no parasite was observed in the section". In view of this report the peripheral blood was repeatedly examined for microfilaria with consistently negative results. Repeated examination of the blood did not reveal any marked eosinophilia and never exceeded 4 per cent. X-ray examination of all the bones including the skull, was normal. Chest films did not reveal any abnormality.

Treatment

The patient was ordered complete bed rest with the affected limb immobilised in a splint. The treatment was started with insulin twice a day at the rate of 30 units in the forenoon and 20 in the afternoon controlled by daily urine examination. There was no restriction of diet. A broad spectrum antibiotic was administered at the rate of 1 g. a day. After a fortnight's treatment with insulin and achromycin, there was no improvement in the general or local condition of the patient. Urine analysis continued to be positive for sugar. The dose of insulin was gradually increased to 60, 80 and 100 units during a period of 3 to 4 months, without any reduction in the blood sugar or urinary output of sugar. The patient was running a hectic temperature. The following drugs were given in succession for a period of 10 days to a fortnight to control the temperature and stop the migrating inflammation but with no effect: Elkosin—6 tablets a day for 10 days.

Hetrazan—6 tablets a day for 7 days. Achromycin intervenous drip—for 3 days. Mycostatin oral for a fortnight. Repeat course of Elkosin for 7 days. Deltacortril—10 mg. a day for a fortnight and repeated at various intervals of a month or six weeks. Local infiltration of hylase into the advancing edge. A course of camoquin for 7 days. Blood transfusion 350 c.c. each time was given on 12-2-57 and 9-7-57. The brawny induration was slowly but relentlessly extending to the lower third of the thigh, while the swelling of the middle third was slowly subsiding leaving a non-tender woody thickness of the soft tissues. During the last 12 weeks of his stay in the hospital, the pain induration had crossed the superficial tissues of the knee joint and had involved the tissues of the leg in an encircling fashion and spread downwards to the level of the ankle joint. During the entire period of the migratory inflammation, the patient suffered great pain intermittently during the waking hours and had to be given sedatives and analgesics. Two further biopsies were taken from the outer aspect of the induration on 28-1-1957 and 2-8-1957 from the lower third of the thigh and middle of the leg respectively for further study of serial sections. A sizeable chunk of the indurated inflamed tissue right up to the muscular layer was removed on each of the last two occasions. A portion of the fresh tissue was sent to the entomologist of the local Veterinary College for examination under a dissecting microscope for the demonstration and identification of any live larvae of some insect, but his report was negative. The request for the examination of fresh tissue for living larvae was prompted by the senior author's examination of the stained serial sections which revealed what looked like broken larval structures in the inflammatory cellular infiltration which has been described under histopathology.

The professor of anaesthesiology of the General Hospital, Dr. Rajagopalan suggested a method of destroying the active larvae *in situ* in the tissues by freezing the limb at the advancing edge and the area above it for some hours, but the idea had to be given up because of roentgenological evidence of calcified arteries of the lower limb and the danger of causing gangrene of the foot. As a substitute for deep freezing, ethyl chloride was sprayed on the skin of the affected area involving practically the lower two-thirds of the right leg, without the foot, daily for a few days which gave relief from the pain and caused slight shrinkage of the tissue without affecting the circulation in any way. The patient insisted on being discharged and promised to carry out the syraying with ethyl chloride with the help of a physician in his own home town. He was discharged from the hospital on 16-9-1957, having been under our care for nearly 9 months.

Histopathology

The dominant histologic picture of a H. & E. stained section from the biopsy specimen is one of eosinophilic granuloma, disintegration of connective tissue fibres and fat, formation of masses of sclerotic pseudotubercles with epithelioid cells, monocytes and foreign body giant cells in the deeper dermis, subcutaneous tissue as far down as the muscular plane. This led us to suspect a parasitic aetiology and serial sections stained with H. & E. Gram, PAS and Ziehl Neelsen were examined. The sections with the differential stains did not reveal any bacteria.

The epidermis and the upper third of the dermis appeared normal except for a sparse patchy round cell infiltration round the blood vessels. The whole of the dermal connective tissue showed marked increase and hyaline change. The skin appendages were atrophied in places showing remnants of hair follicles, and sweat gland tubules surrounded by a sparse round cell infiltrate. Below the sweat gland level, the dermis and the subcutaneous tissue were the sites of acute, subacute and chronic inflammatory infiltration disposed in a haphazard manner. The acute infiltrate consisted predominantly of eosinophilic granulocytes and neutrophils, forming dense masses of micro abscesses. The sub-acute and chronic infiltrate consisted of pleomorphic cells, lymphocytes, histiocytes and eosinophils. In certain areas, there was great destruction of eosinophils and the connective tissue, with acidophilic granules bearing histiocytes and enormous numbers of Charcot-Leyden crystals of various shapes, lanceolate, hexagonal, truncated, and so on. The blood vessels in the region of the granuloma showed considerable thickening with narrowing of the lumen. Between the dermis and the subcutaneous fatty layer and also in the fatty layer itself and in the midst of the cellular infiltration, the inflammatory tissue was more organised in the form of sclerotic pseudotuberculous structures, round or oval, with or without a necrotic centre consisting of an outer layer of concentric fibrous tissue, and an inner layer of palisading histiocytes and fibroblasts and foreign body giant cells (Fig. 1, *vide* Plate). These sclerotic pseudotubercles which showed variation in size and cellular structure were located almost in the same linear plane in the subcutaneous tissue. Often two to four of these structures were grouped into one with an outermost enveloping fibrous layer. Surround-

ing these pseudotubercles was seen a diffuse cellular infiltrate composed essentially of eosinophils, a few neutrophils and occasional monocytes. The deeper connective tissue fibres showed disintegration and the subcutaneous fat extensively infiltrated. Still deeper near the muscle plane was seen a number of pseudotubercles consisting of epithelioid cells, large foreign body giant cells and a good number of histiocytes. The eosinophils were sparsely distributed over this area.

Scattered in the eosinophilic cellular infiltrate and inside the pseudotubercles and giant cells were seen bizarre-looking structures in longitudinal, transverse and oblique sections and in various stages of fragmentation, disintegration and fossilisation. In haematoxylin-eosin stained section the longitudinal structures resemble the moulted cuticles of some segmented larvae and some of them contained spherical and cylindrical basophilic inclusions (Figs. 2 and 3, *vide* Plate). The spherical bodies with a chitinous ring and central button-like eosinophilic inclusions were also found scattered in the cellular exudate and inside the cavity of the pseudotubercles. These were suggestive of spiracles, the respiratory organs of the larvae (Figs. 4, 5 and 6, *vide* Plate). Both the larval cuticles and the spherical bodies were PAS positive. In PAS stained sections, some of the larval fragments inside the pseudotubercles (Fig. 7 *vide* Plate) were observed to have a hook like projection at the narrow end. But in none of the many serial sections examined could we spot a mature larva with the characteristic cephalopharyngeal skeleton.

The sections of the biopsy were examined at the Calcutta School of Tropical Medicine and were reported as follows:

"The sections of the skin and subcutaneous tissue show chronic granulomatous tissue with foreign body giant cells, reticulo-endothelial cells, lymphocytes, plasma cells, neutrophils and masses of eosinophils. Small bits of larval tissue mostly in transverse and oblique section are seen in these sections. The muscle and gland do not show this parasite. As far as can be assessed from these cross sections of the parasite, the condition appears to be one of 'larva migrans', and the larva is one of a nematode probably Ascaris larvae second or third stage.

Discussion

Such a chronic non-suppurative migratory inflammation of a whole limb involving the cutaneous and subcutaneous tissues has not been recorded in the literature. During a period of 3 years, the inflammatory infiltration of the earlier lesions in the upper parts of the thigh gradually subsided side by side with the advance of the inflammation lower down leaving a wooden non-tender subcutaneous hardening of the tissues. From the peculiar course of the illness, affecting successive portions of the subintegumentary tissue in continuity, with resolution of the earlier inflammation, the predominance of the eosinophils in the inflammatory exudate and the presence of broken, fragmented larval elements in longitudinal and cross sections and absence of evidence for bacterial, fungal or protozoal aetiology, the chronic illness was suggestive of an infestation by the larvae of some insect species.

The migratory cutaneous and subcutaneous lesions have been described in connection with the infestation of the skin by two distinct types of larvae.

1. The larvae of certain nematodes, *Ankylostoma brasiliense* of the dog and cat variety, *Ankylostoma caninum*, and *Gnathosma spinigerum*, have been reported as causing creeping eruptions, which are usually seen on the hands and feet consisting of narrow erythematous tunnels, tortuous or serpiginous in outline and situated superficially in the layers of the epidermis, inducing intense itching and a local inflammatory reaction of round cells and eosinophils. The immature worms of gnathostoma whose larval development requires two successive intermediate hosts, the cyclop and fish, may be ingested by man and cause localised fugitive swellings in the skin. These swellings undergo suppuration, abscess formation and on rupture of the abscess, the worm may be recovered alive or dead. The larvae of other nematodes, such as *Strongyloides stercoralis* and *Ascaris lumbricoides*, *Ankylostoma duodenale*, *Necatar americanus* may cause pruriginous dermatitis and urticaria but have not been reported to cause creeping migratory lesions in the skin. Zahawi and Owanessian, cited by Chatterjee (1952), reported the only case of a tumour mass (1·5 cm.) caused by ascaris larvae in the subcutaneous tissue of the abdominal wall. The larvae of the nematodes are unsegmented, minute and are demonstrable only under the low power of the microscope.

2. The next and more common types of larvae causing migratory cutaneous and subcutaneous inflammatory lesions in man, are the dipterous larvae of certain myiasis-producing flies. Among the myiasis-producing flies, there is a group of obligatory parasites, whose larvae complete their cycle of development in the tissues of mammals including man. The larvae of the cattle fly *hypoderma bovis*, horse fly *gastrophilus*, the tropical warble fly *Dermatobia hominis* and the old world screwworm, *Chrysomyia bezziana*

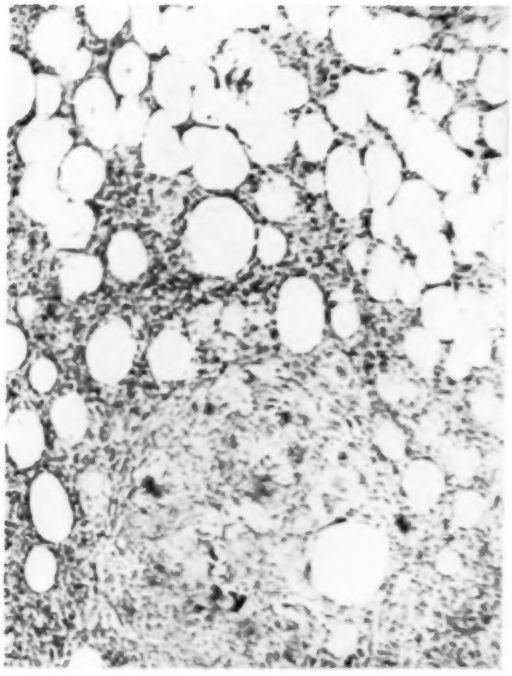


Fig. 1—Photomicrograph showing chronic granuloma with eosinophils, histiocytes and giant cells in the fatty subcutaneous layer. H. & E. x 150.

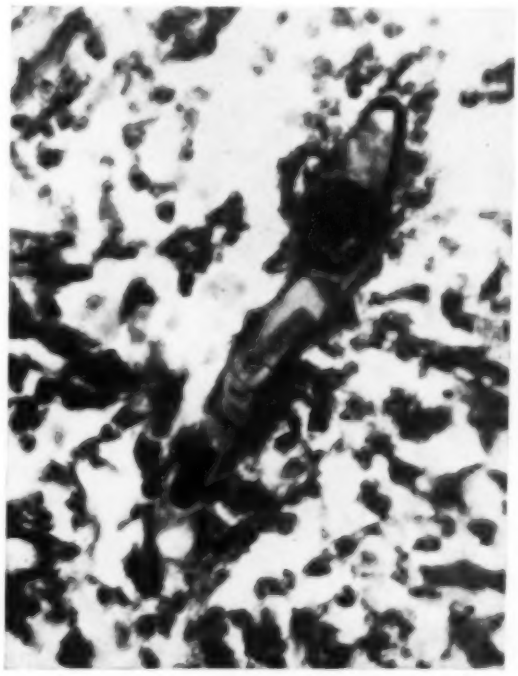


Fig. 2—Photomicrograph showing segmented larva with deeply basophilic spherical and cylindrical inclusions (?) spiracles. H. & E. x 400.

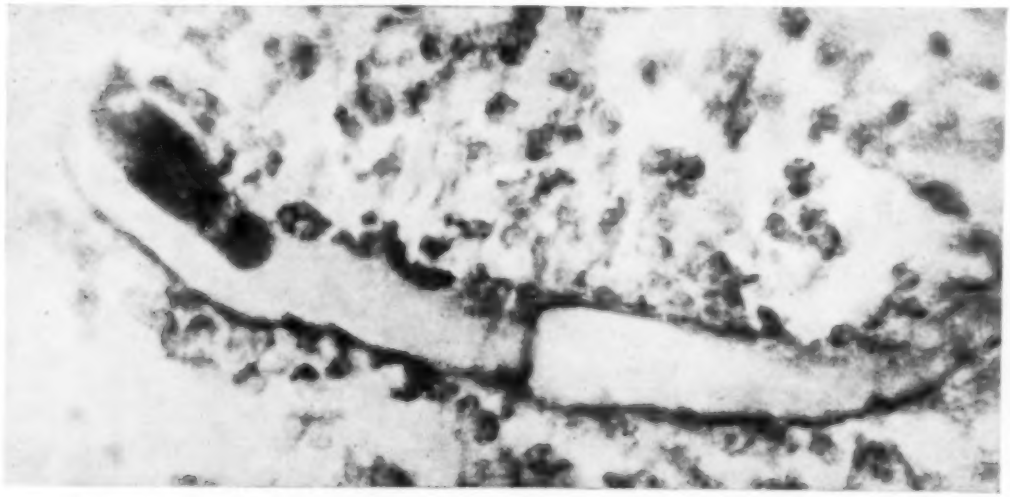


Fig. 3—Photomicrograph showing a segmented larva with sharp anterior end and broad posterior end with a (?) spiracle. H. & E. x 800.

Fig. 4—Photomicrograph showing larva with spines and (?) spiracles lying in a free space. PAS × 400.

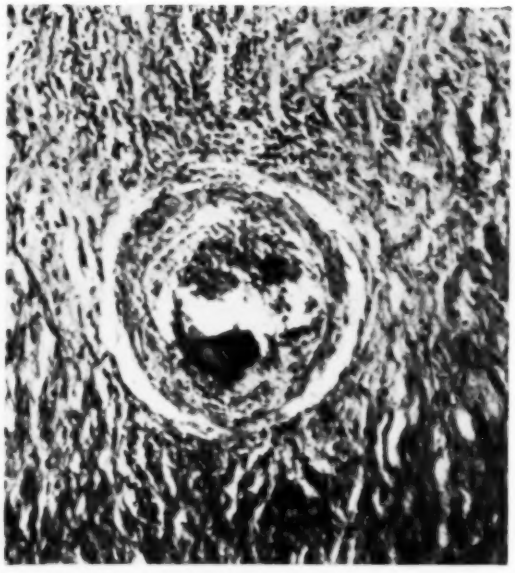


Fig. 5—Photomicrograph showing a pseudo-tubercle containing section of a bent larval structure with (?) spiracle. PAS × 400.

Fig. 6—Photomicrograph showing two hemispherical structures (?) spiracles each containing a deeply staining eosinophilic body lying in apposition and surrounded by eosinophilic granulocytes. H. &. E. × 100.

Fig. 7—Photomicrograph showing multiple pseudo-tubercles surrounded by fibrous tissue and containing fragments of larva. PAS × 125.

ENGRAVED & PRINTED BY REPRODUCTION SYNDICATE, CALCUTTA 6

have been described and identified as causing creeping migratory cutaneous lesions in man. Among the specific myiasis-producing flies, there is a group whose larvae penetrate the unbroken skin and the infestation is from a single larva. Examples of this group are *Hypoderma bovis, Dermatobia hominis* and the *gastrophilus*. The lesions are usually epidermal or subepidermal, forming fantastic patterns of creeping eruptions and the track of the migration could be observed with the naked eye. There is another group in which the female flies are attracted to animals including man by the odour of blood, necrotic tissue or suppurating wounds. The eggs or larvae are deposited in and round the diseased tissue and cause cutaneous and subcutaneous myiasis, the infestation consisting of a large number of larvae. The larvae of *Chrysomyia bezziana* found in India and other eastern countries is a typical example.

Fly larvae are footless, cylindrical, tapering anteriorly and truncated posteriorly, distinctly segmented with spiracles, the respiratory organs at the posterior end. The identification of the first and second stage larvae is stated to be a matter of considerable difficulty. They have not been properly identified or sufficiently studied ; while the fully developed third stage larvae are easily identified by the number and constitution of the spiracles. The fully grown third stage larvae of the myiasis-producing flies are much larger than those of the nematodes, varying from 5 mm. to 30 mm. in length and can be seen with the naked eye. The first and second stage larvae of the flies are probably very much smaller and they may be demonstrable only under the low power of the microscope.

The patient in our study is a strict vegetarian and does not keep dogs or cats as pets in his house. The possibility of helminthic infection was considered ; but could not be established, in the absence of ova or larvae of nematodes in the stools, microfilaria in the peripheral blood, the low blood eosinophilia, and the segmented appearance of the larvae in the biopsy sections of the granulomatous tissue and the presence of what looked like spiracles in the sections, although the minute size of the larvae in the tissue was suggestive of nematode origin. Further there has been no recorded instance of the larvae of nematodes in such large numbers leading a parasitic migratory existence in the deeper tissues of the skin and producing a chronic progressive granulomatous inflammation of an entire limb.

In the case under report, the patient had been suffering from a severe type of diabetes mellitus and the initial inflammatory swelling which the patient developed in December 1954 in the upper third of the thigh was probably a pyogenic subcutaneous abscess, which softened, suppurated and spontaneously ruptured, but was slow to heal. It is highly probable that the larval invasion of the skin and subcutaneous tissues, might have taken place by one of the myiasis-producing flies, depositing their eggs or larvae into the unhealed discharging abscess cavity. When the abscess healed, the larvae securely interned in the deeper dermis and subcutaneous tissue, started burrowing along the deeper planes and commenced its blind slow migration both circumferentially and longitudinally, causing the intense, non-suppurative eosinophilic tissue reaction. In spite of the daily administration of large amounts of insulin and dieting, the diabetes could not be brought under effective control, because of the chronic eosinophilic granuloma, which in its turn, was not responding to rest and treatment, because of the diabetes, the two interacting in a vicious cycle. A certain risk was deliberately incurred in administering the corticosteroids along with the antibiotics, but the diabetic state was not in any way worsened. The former was given for its anti-inflammatory and anti-allergic effect, but there was no arrest of the slow spreading inflammation.

In the case under report, the infestation and the reactive changes were confined to the deeper part of the corium and subcutaneous tissue up to the muscular layer ; the epidermis and the upper and middle corium being comparatively free from the infection. Considering the large number of larval elements scattered either free and fragmented or enclosed in microfibrous tissue nodules, it is a reasonable surmise that a considerable number of larvae must have gained entrance into the tissue. If these larvae were of the specific obligatory group, they should have burrowed their way after successive moultings, through the epidermis to complete the life cycle. But during nine months of observation there was no evidence of softening of the skin and discharge of the larvae. A serious omission in our study was the failure to have performed a biopsy of the normal skin and subcutaneous tissue immediately beyond the inflammatory border of the lesion and examination of the fresh tissue under the dissecting microscope for the presence of the live larvae. Fresh inflamed tissue did not reveal any live larvae and the stained sections showed only fragmented and dead parasites.

On 6-2-1958 a letter was sent to the patient requesting for information about his condition. Replies were received both from the patient and his medical attendant. It would appear the application of ethyl chloride spray to the advancing area of the granuloma was tried for 10 days after discharge from the hospital. The patient failed to

obtain any relief. The inflammation had continued to migrate until at the time of his reply, it has involved the entire foot including the toes in one massive extremely painful induration, with commencing gangrene of the toes. The patient is bedridden, febrile and is receiving symptomatic treatment from his local medical attendant. The thigh and upper two thirds of the leg are free from inflammatory reaction and pain. He was advised amputation of the leg and foot at the seat of election, in a nearby district hospital, as he could not be persuaded to come to Madras.

Summary

An unusual case of chronic migrating eosinophilic granuloma affecting the cutaneous and subcutaneous tissues of the right lower limb is presented. From the histopathological studies of the stained sections of the granuloma, there is a reasonably strong suspicion that the disease is caused by dipterous larvae of a specific myiasis-producing fly. The identity of the parasite could not be established by the authors. The empirical treatment with a multiplicity of drugs together with the antidiabetic therapy, failed to arrest or alleviate the infection.

Acknowledgments

Our thanks are due to Drs. P. N. Rangiah and Sankaran for the case notes, to Professor G. S. Viswanathan and Dr. V. C. Anguli of the Pathology Department of the Madras Medical College for their help in the processing of the biopsy material and study, to Drs. A. R. Natarajan, Veeraraghavan and A. Krishnan for their technical assistance in the preparation of a number of photomicrographs. We are grateful to Professor R. N. Chaudhuri and his staff of the Calcutta School of Tropical Medicine for the report on the sections of biopsy material sent to the former.

Reference

Chatterjee, K. D.—Human Parasites and Parasitic Diseases, 1952, Published by the Author, Calcutta.

PRACTITIONERS' SERIES

MYRINGOTOMY IN OTITIS MEDIA

KESHAV KUMAR, M.B., B.S., D.L.O.

Hyderabad-Deccan

The family physician is usually approached first for the relief of the symptom of pain in the ear, specially in children and he has to decide the line of treatment, for the relief of pain first and then tackle its cause. Older children can tell the physician about the character of the pain but babies and infants cannot. In the case of infants, pulling the ear, scratching behind the ear and putting the finger into the external auditory canal are indications for the physician.

With the advent of chemotherapeutic agents and antibiotics, everyone uses them either alone or combined to tackle the inflammation. In some cases the results are satisfactory, but in others they do not come up to expectations. The reason for this is that when there is accumulation of fluid in the middle ear cavity, it is not let out. It is in these cases that myringotomy is indicated. When this is done at the proper time, the period of suffering is lessened and, above all, the function of hearing is not impaired. If the accumulated fluid is not let out, there is likelihood of a perforation with some loss of hearing. This loss of hearing in the patients can be averted if myringotomy is done.

Types of Otitis Media

Otitis media is of two types: 1. Non-suppurative and 2. Suppurative.

The non-suppurative type is divided again into two sub-types: (a) Secretary transudative non-inflammatory and (b) Secretory exudative inflammatory.

Both the non-inflammatory and the inflammatory varieties have in common the collection of the fluid in the middle ear, with closure of the Eustachian tube. The condition may be transudative and non-inflammatory from the beginning or may subsequently become secretory exudative inflammatory.

Secretory Transudative Non-Inflammatory Middle Ear Disease (Hydrotympanum):

This condition is characterised by collection of fluid, in the middle ear. The fluid is clear, broth-like in nature and does not contain any of the elements of inflammation. This condition is often found in infants and is also common in aviation personnel. The affection may be secondary to mild rhinitis, low grade sinusitis, or low grade rhinopharyngitis. In aviation personnel, one gets aero-otitis media, with a collection of serosanguinous fluid in the middle ear, which is due to rapid descent of the plane, causing a quick increase in the atmospheric pressure, with the resultant intense closure of the Eustachian tube. A partial vacuum is thereby created in the middle ear resulting in hypersecretion, osmosis, capillary rupture and occasional frank bleeding into the middle ear.

The tympanic membrane is retracted at first but later when the fluid accumulates in the middle ear, a hair-line fluid level may be noted. When

the middle ear is completely filled with this fluid, the drum bulges into the external auditory canal. The patient shows mixed type of deafness.

Atropine sulphate is a most potent and useful drug. It helps to dry up all secretions. Decongestion of the nose is essential and chemotherapy also may be employed. Tympanic inflation must be done.

When adenoids are present, radium can be applied and if the sinuses are involved, they must be irrigated. When all these conservative measures fail, myringotomy comes into the picture.

SECRETORY EXUDATIVE OTITIS MEDIA (CATARRHAL OTITIS MEDIA) :

This condition is characterised by collection of turbid fluid in the middle ear, with elements of inflammation.

The chief subjective symptoms are impaired hearing and tinnitus. Usually there is feeling of blocking in one or both the ears.

The drum is diffusely red during the early stage of the disease and may be retracted. Normal landmarks are absent. The drug later becomes oedematous and bulges.

Steam inhalations with tincture benzoin co. twice a day ; use of decongestant solutions to nose by copious irrigations with hot saline may be recommended. If there is pain, instillation of warm drops of 5 per cent carbolic acid in glycerine is best. Chewing gum and swallowing of saliva should be encouraged after nasal and tubal decongestion. Before attempting tympanic inflation, make sure that the nose and paranasal sinuses are free of pus. Pneumomassage and diathermy treatment may be beneficial.

Myringotomy should be done when necessary to permit the escape of exudate and prevent formation of granulation tissue, adhesions and permanent retraction of the drum with resultant deafness.

ACUTE SUPPURATIVE OTITIS MEDIA :

Anatomical variations of the Eustachian tube and nasopharynx also play a role in the aetiology of this condition, in addition to the bacteria being the main and exciting cause. The Eustachian tube in infants and young children, as compared with that in older children and adults, is shorter, more patent and more nearly horizontal and it is in this age group that middle ear infections are most commonly seen. Certain families are more prone to ear infections than others. The general symptoms particularly significant in infants and young children, are food refusal, nausea and vomiting and sometimes diarrhoea. The symptoms are paediatric but the signs are otological. The temperature may shoot up to 40°C (104°F).

There is deafness, fullness in the ear, and pain. Examination of the drumhead is most important and for this one requires good light and magnification. As a routine the patient is put on sulphonamide or antibiotic, but once there is bulging of the drum, which is due to accumulation of gas and pus in the middle ear, myringotomy must be performed. If the incus is dislocated, suppurative labyrinthitis and meningitis may soon follow.

A suppurative maxillary sinusitis is usually formed on the same side as the acute otitis media. When this complication is present it is better to irrigate it through the natural ostium, because resolution of the condition of the sinus is improved. Prognosis as to function is very good when energetic treatment is given, coupled with myringotomy, when indicated. Attention to predisposing causes is also essential to prevent the onset of deafness.

TECHNIQUE OF MYRINGOTOMY

In infants—In the case of infants anaesthesia is not necessary. The infant is rolled into a towel and thus immobilised and an assistant fixes the head. The pinna and the external auditory canal are cleaned and sterilised with spirit and with a good light and ear speculum, a curvilinear incision is made behind the handle of the malleus from above downwards, beginning in the posterior superior quarant of the drum and extending down into the inferior quadrant. The fluid is aspirated and suction through a cannula should follow immediately. When a suction apparatus is not available cotton mops should be used to mop up the fluid. Pneumomassage, i.e., massage of the tip of the mastoid process, is imperative and should always be instituted to prevent adhesions and impairment of hearing. Aural medication in the form of drops or syringing should not be resorted to since it may introduce sepsis.

In children and adults—In children and adults it is done under local or general anaesthesia according to the need. For local anaesthesia either a 2 per cent solution of anethaine with adrenaline or a solution made of 30 grains each of phenol, menthol and cocaine may be used. The ear canal is filled with the anaesthetic and allowed to remain for 20 minutes and then dried up with cotton-wool mops. General anaesthesia may be used if desired. Any short-acting anaesthetic like nitrous oxide, ethyl chloride, pentothal sodium may be used. If these are not available chloroform may be used.

Complications—The *facial nerve* may be cut or the *jugular bulb* may be incised in cases of dehiscenses in the floor of the tympanum.

In conclusion, myringotomy should be performed when 48-72 hours of full chemotherapeutic or antibiotic treatment has failed to control an acute otitis media with a bulging drum. It is imperative to maintain prolonged drainage of the middle ear and no patient suffering from acute otitis media should be discharged from attendance until the appearance of the drum and hearing have returned to normal.

SPECIAL ARTICLE

IS QUININE A 'DEAD' DRUG ?

A Re-appraisal of its Medical and Other Uses

B. MUKERJI, D.SC., M.B.B.S., F.P.S., F.A.A.A.S., F.I.C., F.N.I., ETC.

Director, Central Drug Research Institute, Lucknow

INTRODUCTION

Before the advent of synthetic antimalarials, quinine held a supreme position in the field of malaria therapy. As a result of shortage of quinine in the 1914-18 war, the Germans had attempted to develop synthetic antimalarials, and the first one to be produced was plasmochin (pamaquine) ; later atebrin (mepacrine or quinacrine) was synthesised. Despite the advent of these drugs, very little advance in the chemotherapeutic control of malaria occurred between 1926 and 1940. Mepacrine was considered as valuable in the treatment of malaria but of secondary importance to quinine, whereas pamaquine was thought to have very limited field of usefulness. It was known to have action on the gametocytes and in combination with quinine to reduce relapses in vivax malaria.

During the war of 1939-45, the allied nations were faced with the problem of having to maintain armies in highly malarious countries with entirely inadequate supplies of quinine due to the Japanese occupation of Java. They were thus forced to reconsider the value of the antimalarials still available and to find effective means of reducing the incidence of malaria. Mepacrine received intensive study and was found to possess excellent therapeutic and suppressive properties. The study of the chemical structure of known antimalarials gave clues to the synthesis of other antimalarial drugs. An important event during the last war was the discovery of sontochin and resochin (chloroquine) by the Germans. Work continued on synthetic lines, and other drugs were produced and all these entered into competition with quinine, aided by vigorous methods of distribution which were adopted by the trade. One unexpected but most notable advance about this time was the control of malaria by DDT largely tried in the first instance by the Army with success.

A. USE OF QUININE IN MALARIA

(1) *Quinine vis-a-vis synthetic antimalarials*—A long procession of drugs has thus been witnessed in the recent past, but not all of them are equally efficacious in malaria. It takes some years to assess their real value. Some synthetic antimalarials had come into existence and almost entirely disappeared from the field after their demerits were found out. But quinine has stood the test of time. Mepacrine is about as good as quinine ; chloroquine and amodiaquin are less potent. But quinine has partially lost its former position because of the advent of the newer drugs, its bitter taste, longer course and some side-effects, slight though they may be. The synthetic drugs are also not without toxicity. Pamaquine, mepacrine, proguanil, chloroquine and daraprim have all been known to cause untoward reactions. But their slower excretion from the body makes them very suitable for suppressive use, and it is even possible to use some of them in a single dose for clinical cure of malaria, followed by weekly or even fortnightly doses to prevent recurrences. In this respect they are certainly superior to quinine. All these advantages have induced many physicians to concentrate on the use of synthetic drugs, and discourage the use of quinine in the treatment of malaria.

But, inspite of the prevailing tendency amongst teachers of medicine and therapeutics to stress the virtues of the newer plasmocidal drugs against the established properties of quinine, it is still not possible to dislodge it from its pre-eminent place in therapeutics. An attitude of remarkable indifference to the use of quinine is also becoming prevalent amongst newcomers to medical practice in the tropics so much so that one is obliged to conclude that the present-day teaching in tropical medicine fails to stress the salient fact that quinine is still our sheet anchor in the treatment of acute malaria.

(2) *Advantage of quinine*—Quinine has certain advantages which give it a definite place in the field of therapy. It is a reliable drug, effective in benign and malignant malaria ; in fact, it is probably the best drug in the immediate treatment

of certain complications of the latter type. It can be given by mouth, intravenously or intramuscularly. In addition, in the treatment of relapsing vivax malaria, quinine in association with pamaquinine or some other 8-aminoquinolines is still the most useful medicament. Quinine has the reputation of precipitating blackwater fever, but it is not certain that quinine is solely responsible for this complication and it is very probable that there are other causative factors as well. Drug resistance is almost unknown with quinine except that a few strains of plasmodia may require higher doses than usual.

There are two reasons why quinine should still have preference in this country. These are: (1) India is a cinchona producing country, and (2) we are still dependent on foreign countries for the synthetic antimalarials. It is, therefore, incumbent on the medical profession to give the indigenous product a large share in the treatment of malaria.

B. Use of Quinine in Conditions other than Malaria

(1) *As analgesics and antipyretics*—Quinine in oral doses of 0·3 to 0·6 g. is employed for the relief of headache, myalgia, arthralgia, neuralgia, etc., and for reducing fevers. It has, therefore, the same general field of usefulness as the salicylates but is somewhat less effective. Quinine, in combination with other antipyretics, is generally used in various febrile conditions.

A popular prescription utilizing such a combination (Koppanyi, 1950) is given below:

R/

Quinine sulphate	...	gr. 20
Acetophenetidin	...	gr. 50
Sodium salicylate	...	gr. 20

Fiat pulv. 10. One powder t.i.d.

Quinine potentiates the effects of analgesics, hypnotics and anaesthetics in animals without increasing the acute toxicity of the drug. Quinine, by itself does not produce analgesia, depression of the central nervous system or hypnosis and the potentiating effect is found only when quinine is administered together with or prior to but not after the agents. The dosage is 10 mg. to 100 mg./kg. and the optional premedication time is 30 minutes to 60 minutes prior to a narcotic or hypnotic (Orahovats *et al*, 1957). This is probably also true in man.

(2) *In neuralgic affections*—Lurie (1930) obtained excellent results in trigeminal neuralgia by injecting 5 c.c. of 1 per cent quinine and urea hydrochloride solution near the trigeminal nerve.

(3) *In lumbago*—Souttar (1923) reports good and prompt action in acute lumbago by injecting 5 c.c. of 1 per cent of the above solution with long fine needle in the centre of the painful spot.

(4) *In sciatica*—In the treatment of this affection, 15 to 30 c.c. of 1 per cent quinine and urea hydrochloride solution in the region of the sciatic nerve is recommended (Koppanyi, 1950). Care should be taken to avoid injection into the nerve substance.

(5) *In muscular rigidity*—Milhorat (quoted in U.S.D., 1955) used it to relieve the muscular rigidity in paralysis agitans. It has been used for chorea.

(6) *In night cramps* (Gootnick, 1943)—Painful spasms of muscles of the extremities in middle life and old age which usually occur after retirement, are referred to as 'night cramps'. Moss and Herman (1948) have shown that 200 to 300 mg. of quinine sulphate orally before evening meals and at bed time gives prompt relief in this condition.

(7) *In mytonia congenita and allied conditions* (Waring *et al*, 1940; Goodman and Gilman, 1955)—This disease consists of marked increase in the skeletal muscle tone resulting in difficulty of voluntary movement. Quinine has been shown to cause dramatic improvement when given orally in myotonia congenita in a dose of 0·3 to 0·6 g., repeated two or three times daily. The alkaloid is not curative and exerts its beneficial effect only as long as it is given. Pharmacologically, at least, myotonia congenita is the opposite of myasthenia gravis, and the drug effective in one disorder aggravates the other. The locus of action of quinine appears to be directly on the skeletal muscle, perhaps particularly on the end plate.

Quinine is also effective in obliterating the muscular rigidity in goats suffering from congenital myotonia.

In cases of myotonia atrophica manifesting muscular dysfunction, quinine is sometimes effective but does not influence the muscular atrophy, cataracts, baldness, ovarian dysfunction and testicular atrophy characterizing this disorder.

In dystonia musculorum deformans, Hassin (1939) has reported favourably on the use of quinine for symptomatic therapy of the uncontrollable movements. He has also obtained promising results with quinine in so-called spasmodic torticollis.

(8) *In prevention of fracture occurring during experimental convulsion*—Bennett and Cash (1941) reported that it prevented fractures of the vertebrae during the therapeutic convulsions induced by leptazol.

(9) *In extra-systoles of the heart*—Quinine is advocated for the palpitation associated with extra-systoles of the heart. Quinidine, a related

alkaloid, has a definite place in this condition (see later).

(10) *In amoebic dysentery and pinworm infestation*—Quinine has been used orally and in the form of enemata (1 : 2500 soln.) in the treatment of amoebic dysentery and of infestation by pinworm. The effect in these conditions are, however, not specific. Symptomatic relief in pinworm infestation occurs probably because of the quinine present in the enemata.

(11) *In diagnosis of myasthenia gravis* (Harvey and Whitehill, 1937 ; Koppanyi, 1950 ; Goodman and Gilman, 1955)—Quinine can be used as a diagnostic test for myasthenia gravis. Subclinical symptoms become obvious after quinine, and if prostigmine is then given these symptoms improve quickly. Ingestion of 0·3 g. quinine sulphate twice within an interval of 3 hours will increase the symptoms of myasthenia (ptosis, diplopia, etc.).

(12) *In diagnostic test of hyperthyroidism*—As quinine is better tolerated by patients with hyperthyroidism a diagnostic test involving administration of 300 mg. to 1 g., 2 or 3 times daily has been proposed, failure to develop symptoms of cinchonism suggests presence of hyperthyroidism.

(13) *As a test for gastric achlorhydria*—Segal (1951) administered 50 ml. of 7 per cent ethyl alcohol with a glass of water in the fasting state to stimulate gastric secretion followed in 30 minutes by ingestion of 2 g. of quinine containing cation exchange resin with water. At the end of 1 and 2 hours respectively the urine is collected and analysed ; if no quinine is present the patient does not secrete HCl in the stomach.

(14) *In multiple sclerosis*—Brickner (1935) found that the esterase content in the blood of multiple sclerosis patient was higher than normal. Quinine was found to inhibit the esterase activity in a series of cases of multiple sclerosis. Ten to fifteen grains of quinine are given three times a day until signs of toxicity develop, and then the drug is gradually reduced to the point of tolerance and maintained at that level.

(15) *In trophic disorders*—Welcker (1940) obtained good results in trophic ulcer, trophic and vasomotor disorder following wounds and scars by injecting 1 per cent quinine and urea hydrochloride solution in the nerves that serve the affected areas or in the scars. This use however is no longer popular.

(16) *Miscellaneous uses of quinine* (Goodman and Gilman, 1955) :

(i) Quinine is used as a stomachic. Appetite may be improved by taking a small amount of a quinine-containing mixture. The action is due to the bitter taste and mild irritant action of the quinine. In the treatment of rectal constipation, quinine is sometimes used in suppositories or in solution as small enemata. The mechanism of action is probably rectal irritation, because quinine taken orally does not increase bowel activity.

(ii) For preventing burns due to ultra-violet radiation, a paste of quinine affords a degree of protection, if applied to exposed parts in a moderately thick layer.

The following formula (Hutchison, 1948) is very useful :

R/		
Quinine bisulphate	...	gr. 10
Hydrated wool fat	...	oz. ½
Petrolatum	...	oz. ½
m.f. ung.		

Strakosch (1942) found that in aquaphor but not in lanoline or petrolatum, quinine protected the skin against sunburn. However, dermatitis may occur, and this use cannot be recommended now.

(iii) In disorders of the skin—Davidson and Bart (1938) found that quinine bisulphate was of value in the treatment of erythematous stage of lupus erythematosus, particularly when the tuberculin reaction is negative. Gordon quoted by Mitchel-Heggs (1950) has reported that he recently saw a patient who was affected regularly with lupus erythematosus while in the tropics, except when taking quinine as an antimalarial measure. This work has not been confirmed however.

(iv) As a contraceptive agent, quinine has been employed in jellies and douches but its spermatocidal efficacy is low and unreliable.

C. The Use of Quinine in Surgery

(1) *Bactericidal action* :

(i) McDonald (1915) quoted by Welcker, (1940) is of the opinion that quinine bisulphate best fulfils the requirements of an ideal irrigation fluid for bladder in cystitis. A 1 in 2,000 solution of quinine bisulphate may be used to irrigate bladder in cystitis.

(ii) Chronic septic conditions. Before the introduction of antibiotics, quinine salts were being used with success in these conditions either by oral or intramuscular route (Welcker, 1940). This use has been completely given up in favour of single or combined antibiotics now easily available.

(iii) Prophylactic against post-operative complications, Petrilli (1932) quoted by Welcker (1940) used to give 3 tablets of 3 grams of quinine hydrochloride daily for 6 to 7 days to patients after surgical operations to prevent secondary

sepsis. He obtained good results with this treatment. To-day, one can hardly recommend this prophylactic use when potent antibiotics can give more reliable results.

(iv) *Geiger* (1934), Mutschler (1936), Kappis (1937) and Flossbach (1935) have found quinine salts to be very effective in preventing post-operative pulmonary complications. Modern physicians will not be inclined to put any reliance on these early observations of general practitioners but the idea is still considered logical in some quarters.

(2) *Quinine as endothelium destroying and sclerosing agent* (Welcker, 1940 ; Goodman and Gilman, 1955) :

(i) Quinine is sometimes employed in the treatment of varicose veins. It acts by irritating the vascular endothelium causing thrombosis. Quinine hydrochloride with urethane is the preferred preparation because it is neutral in solution. Quinine cannot be considered to be sclerosing agent of choice. Nevertheless, quinine and urea hydrochloride solution is sometimes preferred in the treatment of haemorrhoids, especially those which cannot be treated surgically. A 5 or 10 per cent solution is injected in sufficient quantity to distend the haemorrhoids.

(ii) Good results have been obtained in hydrocele by injecting 2 to 6 c.c. of 10 per cent solution of quinine and urethane into the hydrocele sac after tapping. (Koppanyi, 1950).

(iii) Mammary cysts—Aspiration followed by injection of 1 to 2 ml. quinine and urethane can cure such cysts saving unnecessary operations.

(iv) In fistulas, particularly congenital, quinine and urethane solution has given good results when injected into the fistula.

(v) Much success has been claimed by some surgeons by the local injection of quinine and urethane solution in haemangiomas and lymphangiomas (Welcker, 1940). Some of these uses, however, are no longer considered valid by ethical surgeons today, as complications sometimes arise which may make clean surgical operations difficult later.

(3) *As local anaesthetics*—Certain salts of quinine are sometimes employed as local anaesthetics. Quinine and urea hydrochloride, U.S.P. is the preparation of choice because it is the most soluble and least irritating. However, it is acid in solution and irritates before it produces anaesthesia. The anaesthetic action of quinine is of long duration and several weeks may elapse before nerve function is completely restored. Quinine may be of particular value in conditions where anaesthesia of long duration is desired as in *pruritus ani*. If the concentration of the solution employed is greater than 0·5 to 1 per cent extensive necrosis may follow. In ointment form, quinine has been employed to anaesthetize painful haemorrhoids. An advantage of quinine salts as local anaesthetics is their relatively low systemic toxicity.

(4) *The stimulating effect of quinine on peristalsis after abdominal operations*—Singer (1927) quoted by Welcker (1940) found quinine salt to be useful in constipation and suggested that these would be helpful in cases of post-operative intestinal paralysis. Now that better drugs are available for this, it would not be worth while to recommend revival of this use of quinine.

(5) *As a styptic*—Quinine is used as a styptic (Welcker, 1940) because of its property of hastening coagulation. Better coagulating agents are now available.

(6) *In ophthalmology*—Irrigation of the eye. Stallard (1949) has stated that the use of lotions for irrigation of the eye still plays an important part in the treatment of infective conditions of the conjunctiva (1 per cent solution of quinine hydrochloride).

In purulent ophthalmia, hypopyon and keratitis drops containing 200 mg. quinine bisulphate with 800 mg. boric acid per oz. are useful. Goulden quoted in Hutchison's Index of Treatment (1948) mentions that in diphtheritic conjunctivitis, if antitoxin cannot be secured, quinine lotion (quinine sulph. 4 gr. to the oz. dissolved with smallest possible quantity of dilute sulphuric acid) can be used to irrigate the conjunctival sac 4 times a day.

In corneal ulcer, optochin (ethyl hydrocupreine) hydrochloride is said to have a specific action on pneumococcic ulcers, a 1 per cent watery soln. of the hydrochloride is dropped into the eye frequently or it may be applied directly to the ulcer by a swab 3 times daily. At night it can be used as a 1 per cent ointment in combination with atropine hydrochlor. However, optochin is no longer available easily and, therefore, hardly ever employed in the above manner.

D. The Use of Quinine in Obstetrics (Smith, 1938)

(1) *The use of quinine during the last weeks of normal pregnancy*—It has been found by many workers that quinine when given during the last 3 or 4 weeks of pregnancy in a dose of 4½ grains daily, facilitates and hastens parturition and reduces the danger of haemorrhage and infection.

(2) *Induction of labour by quinine*—Quinine will not start the contractions of the uterus, but will strengthen these when the onset has been brought by some other cause.

(3) In cases of *uterine inertia* quinine may cause the contractions to become stronger, more protracted and more frequent.

(4) Quinine is often given combined with ergot during puerperium to help involution of the uterus.

The following mixture is generally used (Ghosh, 1952):

R/		
Ext. ergot liquid	...	m. 20
Quinine hydrochlor	...	gr. 4
Tincture digitalis	...	m. 5
Sp. chloroform	...	m. 15
Aqua	...	ad. oz. 1

E. The Use of Quinine in Pharmaceutics As a Hair Tonic

Quinine may be of some value in keeping the hair in a moderately sterile condition, whilst the alcoholic solution itself acts as a stimulant (Harry, 1946).

The following formula is used:

R/		
Quinine hydrochloride	...	1·0%
Alcohol	...	30·0%
Water	...	69·0%
Perfume	...	q.s.
Colour	...	q.s.

F. The Use of Quinine in Industry

Recently a new and important use of quinine has been found out to check adulteration of pure ghee with vegetable oil product.

Chakravarti and Dash (1956) have found that if quinine base is mixed with vegetable oil products in the proportion of 2 mg. quinine base to 100 g. of vegetable oil products, the sample does not have any appreciable taste of quinine and can be safely used. Quinine can be detected easily even if one part of quininated vegetable product is mixed with ninetynine parts of pure ghee.

G. The Use of Quinidine

Some mention about the use of quinidine, a sister alkaloid to quinine, will not be out of place here. Quinidine is obtainable along with Quinine from the processing of cinchona bark. Increasing amounts of quinidine can be obtained if the quinine producing factories make an effect to do so. This has almost no rival in therapy of certain heart conditions and is still widely used in many countries.

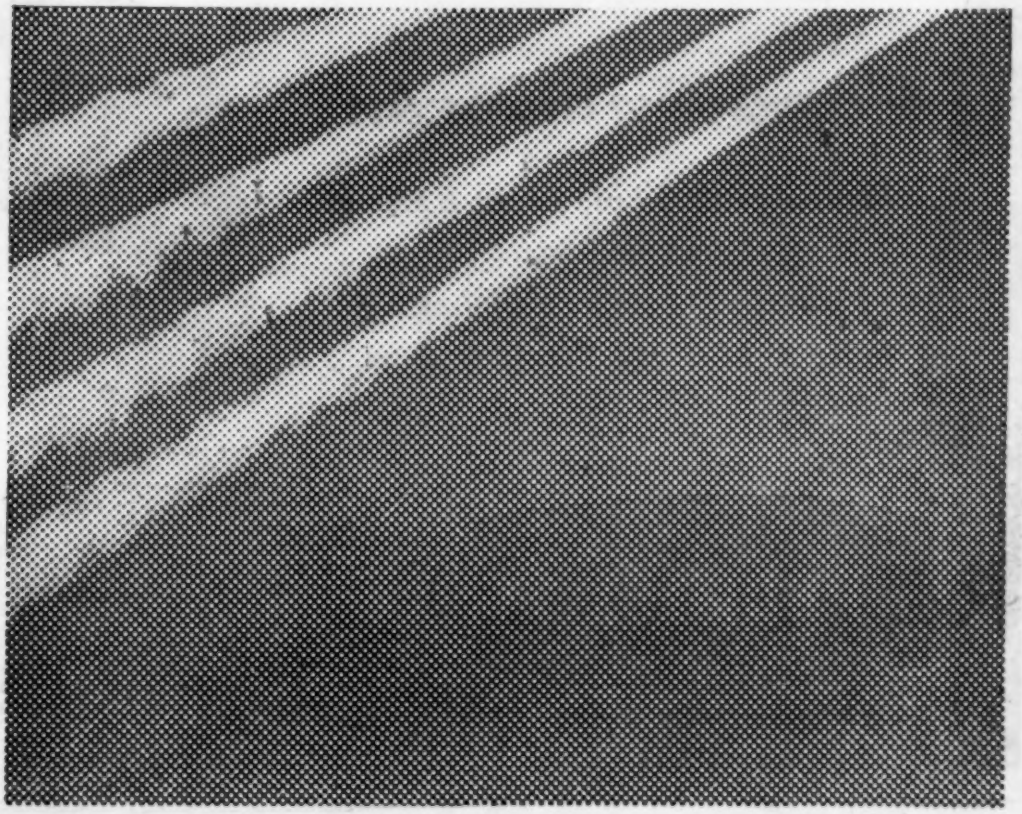
Quinidine has got five different types of action on heart muscle: (1) It prolongs the refractory period of heart muscle. (2) It decreases the myocardial excitability mainly by increasing the refractory period. (3) It alters the rate of the heart. If the rhythm is regular, the heart rate may be slowed. This bradycardia results from the action of the drug on the refractory period of the sino-auricular node where it decreases the rate of impulse formation. (4) It increases the amplitude of contraction of the compensated heart. This is due to the slower rate resulting in increased diastolic filling of the ventricles. (5) It slows the conduction of impulses in heart muscle. The conduction between auricle and ventricle is retarded and various degrees of A-V block may appear after large doses (Goodman and Gilman, 1955).

Quinidine sulphate is used in condition in which the primary disturbance in the heart is due to an increased excitability or to the presence of a focus of ectopic stimuli. Such conditions are encountered clinically in paroxysmal auricular fibrillation, in auricular flutter and in paroxysmal tachycardia (Grollman and Slaughter, 1947).

Concluding Remarks

This survey of the medical and non-medical uses of quinine has been undertaken with a view to increase the rational uses of a drug which had enjoyed tremendous popularity at one time largely in the field of malarial therapy and also in many non-malarial conditions. Due to the growing use of newer antimalarials and the overall reduction of malaria in India as a result of the national antimalaria campaigns with spray insecticides, use of quinine has receded to the background. The situation at present is such that most medical practitioners in urban areas and also in rural areas have either forgotten or are slowly forgetting the use of a valuable drug of Indian origin, not because it is proved to be a worthless remedy but because of the glamour of more fashionable therapy of slightly, if at all, superior therapy. Along with the disuse of Quinine in malaria, its wide range of utility in non-malarial uses is slowly dying out.

A critical re-appraisal of the place of quinine in therapy indicates in no uncertain terms that quinine is not a 'dead' drug by any scientific yardstick of evaluation. It can still serve a very useful purpose in day-to-day practice for a variety of conditions. In fact, it stands on a better footing as a broad-spectrum pharmaceutical than



BOAC streaks ahead in jetliner travel!

PROOF? Yes, indeed. B.O.A.C Britannias, first jet-age airliners to fly the Atlantic, are proudly serving you today ... and new Comet jetliners are already breaking records on transatlantic training flights in preparation for their introduction on the Atlantic later this year. Delivery of a fleet of magnificent B.O.A.C. 707 jetliners is expected next year ... and already earmarked for B.O.A.C. early in the 1960's is a fleet of revolutionary new VC-10 jetliners—fastest, most powerful on the drawing board today. This is how B.O.A.C. is thinking and planning and acting ... determined as always to lead the world in air travel —today and all the tomorrows to come.

B·O·A·C WORLD LEADER IN JET TRAVEL

BRITISH OVERSEAS AIRWAYS CORPORATION

In combating anaemias

Proteolysed Whole Liver Extract
fortified with
Vitamin B complex including
Folic Acid & B_{12}, Vit. C & Iron...

PROLIFEX (OBL)

BENGAL IMMUNITY CO. LTD.
CALCUTTA-13

Each tablet represents :

Proteolysed liver powder (Equivalent to 2 gm. fresh liver)	250 mg.
Stomach powder	10 mg.
Vitamin B_1	2·5 mg.
Vitamin B_2	1 mg.
Niacinamide	10 mg.
Vitamin B_6	0·5 mg.
Panthenol	1 mg.
Folic Acid	1 mg.
Vitamin B_{12}	2·5 mcg.
Vitamin C	20 mg.
Ferrous Sulphate (Exsiccated)	100 mg.
Cobalt Nitrate	5 mcg.

In Packs of 50, 100 & 500

A new approach
TO CONTROL **TUBERCULOSIS**
BY ORAL THERAPY WITH

PASINIDE

ISONIAZID SALT OF P. A. S.

- Rapid control of conditions (Pulmonary, Intestinal, Glandular).
- Freedom from toxicity
- Effective against resistant strains
- Low cost of treatment
- Easy administration

(OBL)

50 & 100 mg. tablets in packs of 100, 500 & 1000.

BENGAL IMMUNITY CO., LTD., CALCUTTA-13.

many other old-time remedies which are still in continuous use. There is room for encouraging its use to a greater extent than at present and to make it a constant component of the modern physician's therapeutic armamentarium. Quinine still remains a safe, dependable and trustworthy drug for routine treatment wherever it is indicated both in specific and non-specific therapy.

REFERENCES

BENNETT, A. E. AND CASH, P. T.—*Psychiat. Quart.*, **15** : 351, 1941.

BRICKNER, R. M.—*Arch. Neurol. & Phychiat.*, **33** : 1235, 1935.

CHAKRAVARTI, R. N. AND DASH, S.—*Bull. Calcutta School Trop. Med.*, **4** : 165, 1956.

DAVIDSON, A. M. AND BIRT, A. R.—*Arch. Dermat. Syph.*, **37** : 247, 1938.

FLOSSBACH, E.—*Fortschr. d. Therap.*, **11** : No. 5, 1935 (Quoted by Welcker, A., 1940).

GEIGER, TH. (1943)—Quoted by Welcker, A. (1940).

GHOSH, B. N.—Pharmacology, Materia Medica and Therapeutics, 1952, Hilton & Co., Calcutta.

GOODMAN, L. S. AND GILMAN, A.—Pharmacological Basis of Therapeutics, 1955, The Macmillan Co., New York.

GOOTNICK, A.—*Arch. Int. Med.*, **71** : 555, 1943.

GROLLMAN, A. AND SLAUGHTER, D.—Cushny's Pharmacology and Therapeutics, 13th Edition, 1947, J. & A. Churchill Ltd., London.

HARRY, R. G.—The Principles and Practice of Modern Cosmetics, Vol. I, 2nd Edition, 1946, Leonard Hill Ltd., London.

HARVEY, A. M. AND WHITEHILL, M. R.—*Bull. Johns Hopkins Hosp.*, **61** : 216, 1937.

HASSIN, G. B.—*J.A.M.A.*, **113** : 12, 1939.

HUTCHINSON, R.—Index of Treatment, 13th Edition, 1948, John Wright & Sons Ltd., Bristol.

KAPIS (1937)—Quoted by Welcker, A. (1940).

KOPPANYI, T.—Quinine and Quinidine Formulary, 1950, Cinchona Products Institute, Inc., New York.

LURIE, W. A.—*New Orleans Med. & Surg. J.*, **83** : Oct., 1930 (Quoted by Welcker, A., 1940).

MCDONALD, E. (1915)—Quoted by Welcker, A., 1940.

MITCHEL-HEGGS, G. B.—Modern Practice in Dermatology, 1950, Butterworth & Co., Ltd., London.

MOSS, H. K. AND HERRMAN, L. G.—*Am. Heart J.*, **35** : 403, 1948.

MUTSCHLER, H. H. (1936)—Quoted by Welcker, A., 1940.

ORAHOVATS, P. D., LEIMAN, E. G. AND CHAPIN, E. W.—*Arch. internat. pharmacodyn.*, **110** : 245, 1957.

PETRILLI, L.—*Rassegna Previd. Soc.*, No. 1-2, 1932 (Quoted by Welcker, A., 1940).

SEGAL, H. L.—*Med. Clin. North America*, **35** : 593, 1951.

SINGER, (1927)—Quoted by Welcker, A., 1940.

SMIT, H. P. A.—The Use of Quinine in Obstetrics, 1940, Cinchona Products Institute, Inc., New York.

SOUTTAR, H. S.—*Brit. M. J.*, **2** : Nov. 17, 1923. (Quoted by Welcker, A., 1940).

STALLARD, H. B.—Editor, Modern Practice in Ophthalmology, 1949, Butterworth & Co. Ltd., London.

STRAKOSCH, E. A.—*J. Invest. Dermat.*, **5** : 1, 1942.

U.S.D., 25th Edition, 1955, J. B. Lippincott Company, Philadelphia.

WARING, J. J., RAVIN, A. AND WALKER, C. E., JR.—*Arch. Int. Med.*, **65** : 763, 1940.

WELCKER, A.—The Use of Quinine in Surgery, 1940, Cinchona Products Institute, Inc., New York.

CASE NOTE

VON WILLEBRAND'S DISEASE (VASCULAR PSEUDOHAEMOPHILIA)

AJOY KUMAR ROYCHOWDHURY, M.B.B.S.

AND

DHRUBABRATA BHATTACHARYYA, M.B.B.S.

Department of Medicine

R. G. Kar Medical College and Hospitals

Calcutta

Von Willebrand (1926) reported a familial haemorrhagic disorder with prolonged bleeding time and normal clot retraction. There was no thrombocytopenia and he named the condition pseudohaemophilia. Subsequent workers (Buckman, 1928; Rosenthal, 1928) noted prolonged coagulation time in some of their cases. Rothman and Nixon (1929) observed poor clot retraction in some cases of their series. Evidences are now in favour that Von Willebrand's disease is a vascular disturbance—the disturbance lying in the capillary contractile power. The hypothesis has been strengthened by the demonstration of delayed capillary contraction in the nailbeds of a few such patients by Giffin (1928) and Macfarlane (1941).

With the introduction of recent techniques for platelet function tests it has been found that some cases of pseudohaemophlia (previously diagnosed as Von Willebrand's disease) are really due to functional platelet inadequacy (Rosenthal *et al*, 1953) as evidenced by an impaired prothrombin consumption and a delayed recalcification in these cases. It should be noted that under the caption pseudohaemophilia has also been described a haemorrhagic disorder as a result of a circulating anticoagulant causing prolonged coagulation time.

In order to avoid confusion, it is desirable that Von Willebrand's disease be called vascular pseudohaemophilia.

With the aetiology and pathogenesis still not very clear the treatment remains unsatisfactory. Blood tran-

fusions are useful during an acute attack but has no effect on the ultimate prognosis. Cases with severe haemostatic defect usually prove fatal in course of time. Some cases show a slightly prolonged bleeding time on examination as the only manifestation of the disease. Chatterjea (1956) reported a case of vascular pseudo-haemophilia in a 13-year-old boy who also had hereditary spherocytosis. The boy inherited the haemostatic defect from the mother and the erythropoietic defect from the father.

In this communication a case is presented which closely resembles Von Willebrand's disease.

Case Report

Bharati, a 11-year-old Hindu girl, was admitted on 1-4-57 with complaints of frequent bleeding from the nose and gums, and an attack of haematemesis associated with fever which had taken place ten days prior to admission. She was known to have a haemorrhagic tendency from her early childhood and this had increased during the last two years. The family history and the past history were of no significance.

On examination she appeared thinly built, stunted in growth and markedly anaemic. The pulse rate was 110 per minute with regular rhythm, the volume and tension being slightly below par. Respiration 26 per minute. The B.P. was 85/60 mm. of Hg. A soft systolic murmur was heard over the pulmonary area. Oozing of blood was seen from the gums and nose. No purpuric spots were seen. Tourniquet test was negative.

Laboratory investigations—Her Hb. (Sahli) was 20 per cent, R.B.C. 1·1 million per c.mm., W.B.C. 5,000 per c.mm., differential count non-suggestive, platelet count 210,000 per c.mm., platelet morphology normal; bleeding time 12 minutes; coagulation time 3 minutes and prothrombin time (one stage method) 16 seconds. Urine and stool examinations were non-contributory.

Treatment and progress—Repeated blood transfusions were given along with coagulants. Haemorrhagic tendency gradually passed off in three weeks' time. Four weeks after admission her Hb. (Sahli) was 40 per cent, R.B.C. 2·53 million per c.mm. and W.B.C. 6,800 per c.mm. Differential count was as before. There were 227,000 platelet per c.mm., platelet morphology normal, bleeding time 7 minutes, coagulation time 3 minutes, 15 seconds. Bone marrow examination was non-contributory. She was progressing well with blood transfusions. On 14-5-57 she had a sudden attack of haematemesis and subsequently there was bleeding from the gums and nose. Blood transfusions and coagulants were given without any effect. She died on 18-5-57.

Discussion

Spontaneous bleeding with persistently high bleeding time and otherwise non-significant haematological evidence characterised the case. Diagnosis of Von Willebrand's disease (pseudohaemophilia) can be reasonably made from these data. Evidence of hereditary influence could not be examined in this case.

Possible diagnosis of homozygous haemophilia in females, purpura simplex, David's disease and Glanzmann's thrombasthenia could be ruled out on the basis of haemotological data.

Summary

A fatal case of Von Willebrand's disease in a female child of eleven years is reported. The case presented prolonged bleeding time and repeated attacks of haemorrhage.

Acknowledgments

Our gratefnl thanks are due to our Professor K. D. Chatterjee for his encouragement and guidance.

We are also deeply indebted to Dr. J. B. Chatterjea, Department of Haematology, School of Tropical Medicine, for his kind help and suggestions.

Thanks are also due to Lt. Col. S. N. Sinha, Superintendent, R. G. Kar Medical College and Hospitals, for kind permission to use the hospital records and to report the case.

References

Buckman, T. R.—*Am. J. M. Sc.*, **175** : 307, 1928.

Chatterjea, J. B. *Bull. Calcutta School Trop. Med.*, **4** : 90, 1956.

Giffin, H. Z.—*Am. J. M. Sc.*, **175** : 44, 1928.

Macfarlane, R. G.—*Quart. J. Med.*, **10** : 1, 1941.

Rosenthal, N.—*J. Lab. & Clin.*, **13** : 303, 1928.

Rosenthal, R. L., Dreskin, O. H. and Rosenthal, N.—*Proc. Soc. Exper. Biol. & Med.*, **82** : 171, 1953.

Rothman, P. E. and Nixon, N. K.—*J. A. M. A.*, **93** : 15, 1929.

Von Willebrand, E. A. and Jurgeins, R.—Finska Lak—Sallsk Handl, **68** : 87, 1926.

Wintrobe, M. M.—Clinical Haematology, 4th edition, 1956, Lea and Febiger, Philadelphia.

JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION
CALCUTTA, JULY 16, 1958

WEST BENGAL HEALTH SERVICES

After our last editorial on "Pay, Status and Remuneration of Medical Men" was published in the issue of this journal dated February 1, 1958, we have thoroughly and very carefully studied the new scheme of the so-called rationalisation of West Bengal Health Services for the State of West Bengal. We presume that the scheme had been prepared, in good faith, with an idea to improve and rationalise: (1) the administration of the West Bengal Health Services; (2) the quality and quantity of the various medical, public health and other categories of health services rendered by the Government of West Bengal to its people in the urban and rural areas; and (3) the standard of medical education and hospital services in the city of Calcutta.

(1) In regard to the administration of the health department of the Government of West Bengal, we feel that too much centralisation of power at the secretariat level has not only created a multiplication of fresh difficulties in the local administrative units, but has also proved definitely detrimental to the best interests of the people of West Bengal. Continued shortage of essential medicines, laboratory reagents and other equipment, hospital equipment and accessories and of the essential medical, nursing and other non-medical staff in almost all hospitals and dispensaries of West Bengal has caused an extreme degree of frustration in the minds of the local administrators and their employees. It is obvious that unless the power and control were even now decentralised, the local officers and administrators would never be able to regain the initiative and the sense of responsibility which are so very necessary for smooth and harmonious working of the peripheral units of an efficient health administration of a State.

(2) As regards the improvement of the quality and quantity of various medical and health services rendered by a State in India, the Bhore Committee, of which Dr. B. C. Roy, the Chief Minister, Government of West Bengal, had been an active, energetic and eminent member, made certain comprehensive recommendations, in the year 1946. The Health Survey and Development (Bhore) Committee advised the establishment of a large number of interlinked rural and thana health centres and the upgrading of the sub-divisional and district hospitals. It is true that a few hundred health centres have been started, here and there, in the rural areas of West Bengal, but have these been properly equipped and adequately staffed and has public health been given the importance it deserves, in the administration of these rural centres?

The Bhore Committee recommended a short-term programme comprising a period of ten years and long-term proposals which were expected to be started 10 years after the implementation of the short-term programme. It is true that shortage of funds and of ancillary trained personnel had led to obstacles in the way of implementation, even if the State Governments concerned desired to put the scheme into effect. So far as the Government of West Bengal is concerned, it is gratifying to note that bold steps had been taken a few years back to put into effect the Bhore Committee recommendations, with some modifications. The increasing cost of construction of pucca buildings for these rural primary centres and shortage of trained nurses and other ancillary personnel again stood in the way and the Government is reported to have changed its programme in this respect.

The Bhore Committee was a committee of experts appointed by the Government of India. It had worked for about three years in collecting data and making necessary recommendations for an all-round improvement in matters concerning the health of the people of India. We would once again request the Government of West Bengal to

review their latest decision in the light of the opinion elicited from the experts and others interested in the promotion of health of the people of West Bengal. To start with, we have the following important data for consideration: (i) West Bengal is short of funds for development purposes even in matters concerning the health of the people; (ii) a very large number of qualified and registered medical practitioners in West Bengal is either unemployed or under-employed and as such technical skill is being wasted in West Bengal for want of proper utilisation; (iii) there is still a shortage of trained nurses, midwives, health assistants and other ancillary personnel, though a very large number of young men and women are unemployed or under-employed in West Bengal; (iv) there are rural areas in West Bengal even now where qualified doctors are scarcely found and extension schemes of community development projects are not contemplated in the near future.

Under the circumstances stated, we would recommend for the consideration of the Government and the legislators of West Bengal that a new scheme be formulated for starting one primary health centre preferably in each Union Board area of West Bengal. For each such centre, the existing available buildings and huts be utilised as far as practicable at the initial stages at least and two to six qualified doctors be appointed in each such centre, with adequate pay and extra allowance for working in rural areas. If there are locally available qualified doctors who are under-employed, these would have to be absorbed in the scheme at least on a part-time basis. All the doctors attached to the centre, whether on part-time or whole-time basis, should undergo, at Government cost, the necessary training in public health and refresher courses and elementary training in special subjects. One of these doctors must be trained as a clinical pathologist and another as an obstetrician, for the benefit of the rural patients. With a short course of training, a number of non-medical young men and women can be employed in these centres, with adequate pay and extra allowances for working in rural areas, as health assistants. As more and more auxiliary nurse-*cum*-midwives would be trained, the question of shortage of such trained personnel would be solved within the next few years.

As each thana area in West Bengal has a population of about one lakh, each such area should have a well-equipped thana centre with about 30 beds at present with a clinical laboratory and an x-ray apparatus for diagnostic facilities along with a chest clinic for the prevention and early treatment of tuberculous patients in rural areas. It is obvious that each thana centre, if properly equipped, would need at least eight to ten qualified doctors of whom at least two must be trained properly in public health. We would recommend utilisation of existing vacant buildings and huts for starting such centres, without any undue delay. Similarly, improvement of sub-divisional and district hospitals need not be linked with construction of huge additional buildings at the outset. Provision of adequate staff, equipment and essential medicines in the initial stages would surely be able to improve matters appreciably, even though the construction of necessary pucca structures may have to be delayed for years for want of the required funds and building materials.

In each well-equipped and modernised sub-divisional and district hospital, a number of part-time specialists would be required. The Bhore Committee recommended in 1946 that such part-time specialists should be offered a grade of Rs. 400-30-700/-. As, with the lapse of 12 years, the cost-of-living index has gone up, this scale would have to be revised and after revision, these posts should be openly advertised and filled up by the Public Service Commission. If the equipment provided at these hospitals are modern and sufficient and the terms and conditions of service are attractive, we can assure the Government of West Bengal that there would not be dearth of suitable candidates for such posts in the subjects of medicine, surgery, midwifery and even in ophthalmology.

(3) As regards the standard of medical education and hospital facilities in Calcutta, we would deal with hospital facilities first. As most of the sub-divisional and even district hospitals of West Bengal are even now ill-equipped and not modernised in respect of staff and equipment, it is natural for a large number of patients to travel long distances to come to Calcutta and flock to one or more of the over-congested city hospitals attached to the medical colleges. In these hospitals, most of them have to be refused admission for want of beds and the investigation of most of them can also not be carried out thoroughly in the out-patients department because the necessary facilities for such investigations have been lacking or been very poor so far. The other common complaints of patients and their attendants usually arise on account of shortage of staff and absence of adequate number of social workers in the emergency room and other departments of the over-congested city hospitals of Calcutta. Provision of additional laboratory and x-ray facilities in busy out-patients clinics of teaching medical institutions, for purposes of investigations and radiotherapeutic treatment of malignant diseases by experts would go a long way in ameliorating the sufferings of the public in this city. In addition, if the suggestions given in the previous paragraphs be not thrown into the waste paper basket, but are acted upon, with the zeal and sincerity these deserve, a large proportion of moffusil patients coming to Calcutta hospitals would not have to take the trouble of coming to the city and the sufferings of such patients as well as those of the patients coming from the city and its suburbs would be mitigated.

In regard to medical education we would request the authorities of the health department to kindly go through the recommendations of the Goodenough Committee, Bhore Committee and of the first World Conference on Medical Education held in London and then consult the teachers of the medical colleges and the teaching staff of the associated hospitals before they formulate and finalise their schemes. The first World Conference on Medical Education held in London in 1953 was attended by more than 600 persons representing 62 countries including India and 127 Medical Faculties. Out of all the countries and the Medical Faculties, the only place where the entire teaching staff—pre-clinical and even clinical—was appointed on a full-time basis was at the Medical School under the Chicago University. It might be recalled that Chicago University was a private university following its own rules and its hospital was run as an entirely paid hospital where no free-patients were either admitted or treated free-of-charge in its out-patient department. The cost of maintaining such a paid hospital with highly paid whole-time medical officers appeared to be the highest even in the United States. It is therefore natural that neither the West Bengal Government nor the people of Calcutta and West Bengal have the necessary means for financing such a scheme in any medical college and its attached hospitals. In the United Kingdom, under the National Health Scheme, the medical teachers were given the option to work either on a whole-time or a part-time basis. The whole-time professorial staff was highly paid and the part-time staff was also adequately paid in proportion to the work put in by them in the hospitals. If the seniormost full-time professor or specialist was paid Rs. 6,000/- per month, the corresponding part-time officer was offered anything between Rs. 4,200/- and Rs. 5,400/- per month. Further, all qualified specialists attached to these teaching hospitals working on an honorary basis prior to the implementation of the national health scheme had been absorbed either on full-time or part-time basis, at their option and the starting salary of an incumbent was fixed in accordance with their teaching and hospital experiences.

We wonder whether, under the existing financial circumstances of the Government of West Bengal, it would be practicable for the Government to adopt a scheme on the lines enunciated

by the National Health Scheme as applied to the medical colleges and their attached hospitals in U.K.? If so, we shall heartily congratulate the Government for taking steps in the right direction. But, before the Government think of taking such a bold step involving heavy financial commitments, it would be their sacred duty to think of the thousands of under-employed and unemployed qualified medical practitioners in West Bengal who have to be absorbed in a national health scheme, not only for the sake of maintaining them but also for preventing the unnecessary wastage of technically qualified persons for no fault of theirs.

Before we conclude, we would appeal to the Government of West Bengal and particularly to the Chief Minister to see that the new terms and conditions of the West Bengal Health Service be carefully re-examined and amended at once. Is it necessary to bring all the medical and health officers as well as medical teachers and collect them under one service cadre, just because their terms and conditions have to be improved? Could not separate cadres be created for medical teachers, public health personnel and medical administrators?

In conclusion, we deem it our solemn duty to point out that the ground must be prepared, the basic principles enunciated and the necessary data collected and classified first, on which the framework of a well-planned and comprehensive health scheme may be built. In the mean time, the Government have to look into the existing defects of the health administration from the secretariat level to the lowest peripheral units and adopt remedial measures for the rectification of at least the glaring defects and deficiencies.

In 1946, the Bhore Committee recommended a basic scale of Rs. 250-500 for qualified part-time doctors. The same year, the Indian Medical Association recommended a basic scale of Rs. 275-800 for qualified part-time doctors and in case of public health and other whole-time officers an extra allowance of 25 per cent of the basic salary. As the cost of living has increased during the last 12 years, the National Medical Association of India has now recommended to the Pay Commission that Rs. 350-950 should be the basic grade of all qualified doctors. The Government of West Bengal have raised their basic scale for qualified doctors from Rs. 200-450 to Rs. 250-650 and not Rs. 350-950 as recommended by the I.M.A. Is it not strange that the Government of West Bengal have indirectly forced a large number of medical officers to agree to work on a whole-time and non-practising basis in order that they may become eligible to draw their salaries in the new basic scale of Rs. 250-650? This small mercy in increment should have been bestowed without entailing with it any other terms and conditions. Moreover, the non-practising allowance for public health and other full-time medical officers should be given at the rate of 25 per cent of their basic salary with a minimum of Rs. 150/- per month, to be fair and reasonable. We would ask the Chief Minister and his Cabinet colleagues in the Government of West Bengal to reconsider this important question once again and see that justice be done to their medical employees.

In teaching medical institutions, should not the honorary visiting surgeons and physicians be given proper academic status and remuneration in lieu of their teaching experience and services rendered? In case of promotion and appointment to higher ranks, is it not fair to consider the legitimate claims of the honorary visiting officers along with eligible paid teaching personnel? Will the Government of West Bengal be pleased to see that there be no cases of nepotism regarding appointments and promotions and even in reappointment of superannuated personnel? Unless these glaring defects are remedied at the outset, from the very base over which the superstructure of a prosperous and magnificent edifice has to be built, is any scheme—call it a scheme of re-organisation or rationalisation—likely to succeed or flourish?

CURRENT MEDICAL LITERATURE

Cardiorespiratory Dysfunction and Polycythaemia in Extreme Obesity

LILLINGTON, G. A., ANDERSON, M. W. AND BRANDENBURG, R. G. (*Proc. Staff Meet. Mayo Clin.*, **32**: 585, 1957) from the Section of Medicine, Mayo Foundation, write that in patients without primary pulmonary or cardiac disease, marked obesity may lead to alveolar hypoventilation, arterial hypoxaemia and hypercapnia, which, in turn, may produce secondary polycythaemia, somnolence, pulmonary hypertension and right heart failure. Adequate loss of weight is accompanied by complete disappearance of this cardiorespiratory syndrome.

In patients with primary pulmonary or cardiac disease, the presence of obesity may aggravate the dysfunction, and loss of weight may effect considerable clinical improvement.

It is suggested that the mechanical effects of obesity in increasing the work of breathing is the primary factor in the genesis of the alveolar hypoventilation which appears to be the significant functional abnormality.

Hypoventilation Syndrome

COATES, E. O., BAINKMAN, G. L. AND NOE, F. E. (*Ann. Int. Med.*, **48**: 50, 1958) of the Pulmonary Division, Henry Ford Hospital, Detroit, Michigan, from the analysis of physiologic studies in selected cases with hypoventilation syndrome observe:

Hypoventilation of the lungs leading to pulmonary insufficiency and respiratory acidosis may be present in a variety of conditions which either mechanically restrict thoracic motion or depress the respiratory centre.

Arterial blood and ventilation studies in four patients with diagnosis of kyphoscoliosis, bilateral pleuritis, radiation fibrosis and gross obesity, respectively, are presented.

All four patients demonstrated varying degrees of alveolar hypoventilation, accompanied by low arterial oxygen saturation, elevated carbon dioxide tension and low pH.

Administration of 100 per cent oxygen resulted in reduction of ventilation in all, and symptoms of confusion and stupor in three.

Respiratory depth is the best practical guide to adequacy of ventilation.

In the presence of hypoventilation, caution is necessary in the use of high concentrations of oxygen and in the administration of narcotics. Therapy with mechanical aids to respiration should be tried, and tracheotomy used early when indicated.

Evidences for Clinical Magnesium Deficiency

FLINK, E. B., MCCOLLISTER, R., PRASAD, A. S., MELBY, J. C. AND DOE, R. P. (*Ann. Int. Med.*, **47**: 956, 1957) of the Medical Service of the Veterans Hospitals, Minneapolis, Minnesota and the Department of Internal Medicine, University of Minnesota write:

The manifestations of magnesium deficiency in patients can be listed as follows: muscular twitching and tremor, which may be mild or severe, with marked choreiform and athetoid movements, and may be so severe that all fine movements, such as handwriting, may be impossible; rarely, carpopedal spasm and positive Chvostek's and Trousseau's signs; profuse sweating; tachycardia and, occasionally, fever; mild anxiety to severe agitation; mild to severe delirium with hallucinations, confusion and disorientation, abusive language and maniacal behaviour; finally, convulsions and coma. Not all patients have all the symptoms and signs listed, but, when one of these is severe, others are apt also to be severe.

There are a number of features which need to be clarified. There are undoubtedly multiple deficiencies in some patients, and particularly vitamin and potassium deficiency. The course of a number of patients can be cited as evidence that correction of potassium deficiency unmasks magnesium deficiency.

There are patients who have low serum levels of magnesium and have no detectable symptoms or signs. On the other hand, there are patients with magnesium concentrations in the normal range who, despite this, have severe manifestations. Such observations are compatible with the view that the essential biochemical defect is a cellular depletion, and that the extracellular concentration is only a poor mirror of this cellular deficit. The skeletal reservoir is a completely unknown quantity in adult humans at present. The extracellular concentration is of importance, certainly, in considering the effects of high concentrations, just as it is in potassium intoxication. The response to treatment in a matter of hours to a day or two also favors the concept that the major manifestations are related to a cellular deficit.

The pathogenesis of magnesium depletion remains obscure. One important factor is the simple deficient intake of magnesium during prolonged periods of parenteral fluid administration and gastrointestinal drainage, or during prolonged alcoholic bouts where alcohol constitutes the chief source of calories.

Another factor which needs further amplification is that of aldosterone. It has been clearly demonstrated that hypomagnesaemia and a negative magnesium balance have been found in primary aldosteronism. One can speculate that conditions such as cirrhosis with ascites and toxaemia of pregnancy, which have been shown to have secondary aldosteronism, have a tendency to magnesium depletion because of an aldosterone effect.

It has been found that the following schedule of intramuscular injection of magnesium sulfate is safe and does not result in hypnotic levels of magnesium when renal function is adequate: 2·0 g. of magnesium sulfate (4 c.c. of 50 per cent solution) every six hours for one day, followed by 1·0 g. every six hours for from three to five days. If magnesium sulfate is given intravenously, it is best to distribute the above total dose for a day in all the parenteral fluids for that day. The maximal dose should be 5·0 g. in 1,000 ml., given in not less than three hours.

Prognosis of Myocardial Infarction

WHITE, P. D., BLAND, E. F. AND LEVINE, S. A. (*Ann. Int. Med.*, **48**: 30, 1958) of Boston, Massachusetts, from

a further analysis of 200 cases of coronary thrombosis with myocardial infarction seen in consultation between 1921 and 1930, inclusive, give in the following lines the summary of their observations concerning the prognosis of myocardial infarction due to coronary thrombosis :

Seven were examined within six hours, 14 more within two days, and 35 more within the first week, making a total of 56 during the first week. During the next three weeks, 34 more were seen, or a total of 90 in the first month. Thirty-two others were seen in the next two months, making a total of 122 patients seen during the acute attack and convalescence therefrom. The remaining 78 patients were seen in consultation later than that.

It is of much interest that there was a steadily decreasing mortality during the first three months. Of 35 who died in the first month, 18 died in the first week and eight in the second week. Of the 42 who died in the first three months, 26 succumbed in the first fortnight, nine more in the second fortnight, and only seven others in the second and third months. It should also be noted that coronary thrombosis kills a certain, at present indeterminable number of patients too quickly for them to be included in any clinical series.

A comparison of the 25 patients among the 90 who were seen by P.D.W. during the first month of their illness and who survived that month and yet died within three years of the onset of their atacks with 23 of this same group of 90 who survived five years showed that, among the former, 14 had cognestive heart failure (six had coronary insufficiency also), seven had angina pectoris without congestive failure, and only four were free from evidence of either complication during their convalescence after the first month; among the latter 23 (who survived five years), only one had congestive failure, four others had angina pectoris, and 18 had recovered completely from their acute attack, showing neither complication.

As emphasized in the 1941 and 1956 reports, the most important clue favouring longevity and a return to a normal program of life was found to be the degree of completeness of recovery after the first month of convalescence from the acute attack. Of the 24 cases who showed neither myocardial nor coronary insufficiency, 18 (75 per cent) survived five years, while the average survival of these 24 cases was 12 years.

Among those who, free of complications, completely recovered from their attack, the eventual cause of death was most commonly coronary, either recurrent thrombosis or sudden death, with or without evident angina pectoris.

There were no mild cases in the whole group of 200 patients, either because such cases were missed or because a consultant was not called in to see such patients. There were 163 of severe and 37 of moderate grade.

Not infrequently during the 1920's the treatment and co-operation of patients such as those seen then by P.D.W. in consultation were inadequate.

It should be added that our attitude concerning the prognosis of coronary thrombosis with myocardial infarction will undoubtedly be much more optimistic in the future than it has been in the past because of the recognition of mild cases, the better treatment and program after recovery, and the more satisfactory understanding and co-operation of the patient.

Elective Cardiac Arrest

Cardiac arrest on the operating table has so far been a dreaded surgical emergency, but the advent of heart-lung machines has made it possible to stop and restart the heart's action at will in intracardiac operations. This technique provides a relatively bloodless operative field, with the heart motionless and flaccid, so that exact placing of sutures is facilitated. Kolff and his colleagues (*J. A. M. A.*, **164** : 1653, 1957), reporting their results in 37 patients undergoing open heart operations, describe how they brought about complete temporary arrest of cardiac movement by injecting potassium citrate into the root of the aorta according to the method originally described by Melrose and his colleagues (*Lancet*, **2** : 21, 1955). The period of cardiac arrest varied between seven and 40 minutes, during which time the circulation was maintained by the use of a heart-lung machine. Normal cardiac rhythm returned afterwards in all but two patients, in whom heart block developed and persisted after operation. Thirteen of the 37 patients died after operation, but 10 of these were judged to be surgical failures. All nine patients with Fallot's tetralogy survived.

It is too soon yet to assess the value and safety of this method of arresting the heart's action during intracardiac operations, since many different factors must influence the results. The patients chosen for operation have for the most part been suffering from the severer forms of congenital heart disease which have a bad prognosis and for which the operation itself is new and of unproved benefit. In addition, the use of a heart-lung machine introduces a definite danger. Whether elective arrest of the heart in conjunction with the use of a heart-lung machine increases or decreases the risk of operation is still uncertain. Theoretically it has the advantage that during arrest the oxygen requirements of the heart are small and hence the danger of cardiac damage from hypoxia during this period is reduced. The technical advantages offered to the surgeon in providing a bloodless and motionless operative field inside the heart are great, but there is also the disadvantage that when large defects are closed in the flaccid heart distortions and tensions may appear on resumption of cardiac contraction. In general, the recent advances in intracardiac surgery have been made possible by a combination of different surgical and anaesthetic procedures rather than by reliance on any single method, and it is likely that a place will be found for the use of potassium to arrest or at least to slow the heart beat as an adjuvant to the complicated techniques now required for the performance of intracardiac operations.—*Annotation, Brit. M. J.*, **2** : 1104, 1957.

Healed Bacterial Endocarditis

HALL, B. (*Ann. Int. Med.*, **47** : 880, 1957) of the Department of Medicine, University of Illinois College of Medicine and Research and Educational Hospitals, Chicago, Illinois, gives below the summary of his observations on the long-term follow-up of six years in 17 patients with healed bacterial endocarditis :

During the first year after penicillin therapy five patients died, three of congestive heart failure and two

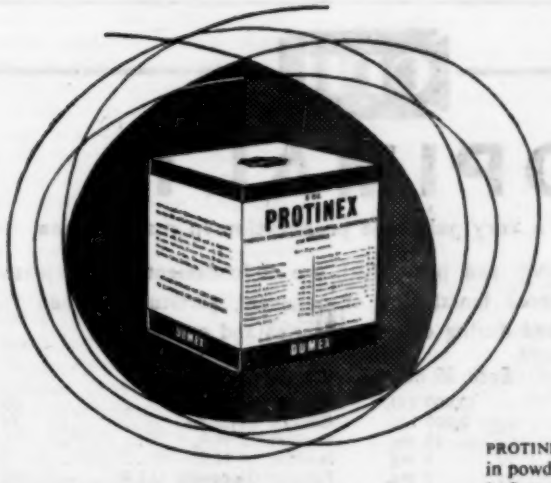
Now they'll like to take

PROTINEX

THE new, pleasant flavour of PROTINEX, and the fact that it dissolves readily, ensures its ready acceptance by all patients.

The ideal protein food, PROTINEX combines all essential amino acids, carbohydrates, vitamins and minerals. Thus, in one formula, PROTINEX provides all the varied nutritional requirements of the body.

New improved taste and solubility!



PROTINEX is available, in powder form, in 8 oz. bottles.

DUMEX

DUMEX PRIVATE LIMITED,
Wavell House, Ballard Estate, Bombay 1.

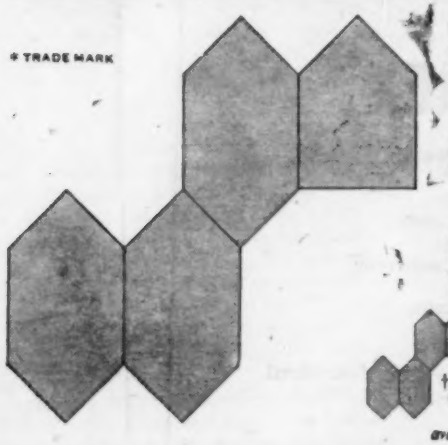
DX. 6507

a new, superior corticosteroid !

LEDERCORT* Triamcinolone

Lederle

* TRADE MARK



SUPERIOR POTENCY--
For greater clinical effectiveness... with the plus value of fewer side effects :

- no edema • no hypertension
- no psychosis • no weight gain
- no potassium depletion

Also, because of the nature of LEDERCORT and its lower dosage†, there is a lower incidence of other important side effects associated with corticosteroid therapy:

- peptic ulcer • osteoporosis
- epigastric distress • diabetic state
- Cushinoid "obesity"

Because of its lower dosage, LEDERCORT Lederle makes prolonged therapy possible at less cost and with greater ease of patient management.

LEDERCORT is indicated in:

- Rheumatoid arthritis • Bronchial asthma
- Dermatoses • Allergic disorders, and the many other conditions in which corticosteroids have proved to be beneficial

†Clinical tests show that in many instances only about ⅔ of the dose of prednisolone is required.

available in Bottles of 10 tablets, Scored. 4 mg. per tablet

LEDERLE LABORATORIES (INDIA) PRIVATE LIMITED
P.O.B. 1994 BOMBAY 1

OPIL

OPIMALT

Opimalt is a very palatable preparation in malted base

of Vitamins calcium and iron which are of fundamental importance for the balanced functioning of organism, particularly when disturbed during disease, allergies and overwork.

Each 30 ml. (fl. oz) Contains :

Vitamin A	10,000 I.U.	Nicotinamide B.P.	30 mg.
Vitamin D_2 B.P.	2,000 I.U.	Choline Chloride	25 mg.
Vitamin B_1 B.P.	10 mg.	Methionine N.F.	5 mg.
Riboflavin B_2 B.P.	1 mg.	Inositol N.F.	2 mg.
Vitamin B_6 B.P.C.	1 mg.	Ferrous Gluconate U.S.P.	300 mg.
Vitamin C B.P.	100 mg.	Calcium Glycerophosphate N.F.	65 mg.
Pantothenol	3 mg.	Calcium Gluconate B.P.	130 mg.
	Malted Base q.s.		

INDICATIONS : As a nutritious and assimilable food for children. During periods of increased need such as growth, pregnancy and diseases such as tuberculosis.

OPIL **Oriental Pharmaceutical Industries Limited.**
64-66, TULSIPIPE ROAD, MAHIM, BOMBAY-16.

of noncardiac causes. Two additional patients died 26 months and six years after penicillin therapy, of coronary heart disease and congestive failure, respectively.

Of 10 living patients followed for from six to 10 years, four are asymptomatic, five have slight limitation of activity, and one is moderately disabled.

Four of the seven patients with aortic regurgitation are now dead, and the other three have shown a decrease in functional capacity. This finding contrasts with that for nine patients who had only mitral valve disease, of whom two are dead, three have worsened symptomatically, and four are unchanged. One patient had the tetralogy of Fallot.

This study shows that some patients may remain well for from six to 10 years after recovery from bacterial endocarditis, especially if aortic regurgitation is not present.

Healed bacterial endocarditis must now be considered in the differential diagnosis of mitral regurgitation and of aortic regurgitation.

Electrocardiographic Patterns of Hypopotassaemia

SURAWICZ, B., BRAUN, H. A., CRUM, W. B., KEMP, R. L., WAGNER, S. AND BELLET, S. (*Circulation*, **16**: 750, 1957) from the Division of Cardiology of the Philadelphia General Hospital and the Robinette Foundation of the University of Pennsylvania, Philadelphia, give in the following lines the summary of their observations on the quantitative analysis of the electrocardiographic pattern of hypopotassaemia:

In 50 hypopotassaemic patients, 2 leads (generally leads II and V_4) of the electrocardiogram were analysed with regard to the following electrocardiographic signs of hypopotassaemia: (1) amplitude of the U wave greater than 1 mm., (2) a ratio greater than 1 of U-wave to T-wave amplitude in the lead with the tallest U-wave, and (3) S-T segment depression more than 0·5 mm. Depending on the number of signs present in the 2 leads, electrocardiograms were termed typical of hypopotassaemia (3 or more signs), compatible with hypopotassaemia (2 signs, or only 1 sign related to the U-wave), and nondiagnostic hypopotassaemia (no sign, or only S-T segment depression in 1 of the leads).

A correlation was found between the electrocardiographic pattern and the plasma potassium concentration. In 17 patients with a potassium level between 2·0 and 2·7 mEq./l., 78 per cent had electrocardiograms typical of hypopotassaemia. In 20 patients with a plasma potassium between 3·0 and 3·49 mEq./l., 90 per cent of the tracings were either nondiagnostic of or merely compatible with hypopotassaemia. In 4 subjects, 6 signs were present in the 2 electrocardiographic leads; each of these patients was in the group with the lowest potassium level.

Appearance of the electrocardiographic signs of hypopotassaemia was not prevented by disturbances of concentration of other plasma electrolytes or by blood pH. Hypocalcaemia and the resultant lengthening of the Q-T interval occasionally caused difficulty because of merging of the T-wave with the U-wave. Hypopotassaemia alone did not influence the Q-aT, Q-T, or Q-aU intervals.

Recognition of the hypopotassaemia pattern often was difficult in the presence of tachycardia, which causes decreased amplitude of the U-wave as well as merging of the P-wave with the U-wave. Attention is directed to the tilted P-wave, a previously unrecognised sign of U-wave prominence, which may cause suspicion of hypopotassaemia, despite tachycardia.

Evidence concerned with the basic cause of the electrocardiographic signs of hypopotassaemia is discussed. The plasma potassium level is considered to be the important factor, either directly or by its large effect on the ratio of extracellular to intracellular myocardial potassium concentration.

Aneurysmal Dilatation of Aortic Sinuses in Marfan's Syndrome

STEINBERG, I., MANGIARDI, J. L. AND NOBLE, W. J. (*Circulation*, **16**: 368, 1957) from St. Francis Hospital and Sanatorium, Roslyn, N.Y. give in the following lines the summary of their observations on angiocardiographic and cardiac catheterization studies in identical twins:

Identical twins, aged 2 years, with cardiac enlargement and murmurs were found to have aneurysmal dilatation of the aortic sinuses and left ventricular enlargement after angiocardiography. Because of these findings, the significance of mild dolichocephaly of the skull, arched palate, and slender fingers was recognised; ophthalmic examination then confirmed the typical bilateral dislocation of the lenses and myopia of Marfan's syndrome.

Right heart catheterization studies in one twin were normal. In the other, the right heart catheterization findings were also normal but a patent foramen ovale permitted left atrial and ventricular pressure determinations. These disclosed an absent left atrial systolic pressure peak, a normal mean pressure, and a narrow atrial pulse pressure, which excluded significant mitral insufficiency. Aortic valvular stenosis was also excluded by the ventricular pressure reading of 69·3/3. The studies suggest that left ventricular enlargement may be due to endocardial disease of the ventricle, not an uncommon finding in necropsy reports of Marfan's syndrome. The discovery of aortic sinus dilatations very early in life also indicates that medial degeneration of the aortic sinuses occurs early and does not develop in response to aortic stress. Not enough time has elapsed to judge the prognostic significance of aneurysmal dilatation of the aortic sinuses in arachnodactyly.

Lessons from Serum Cholesterol Studies

KEYS, A., KIMURA, N., KUSUKAWA, A., BRONTE STEWART, B., LARSEN, N. AND KEYS, M. H. (*Amer. Int. Med.*, **48**: 83, 1958) of the Laboratory of Physiological Hygiene, University of Minnesota, give in the following lines the summary of their observations on the serum cholesterol studies in Japan, Hawaii, and Los Angeles:

The low incidence of atherosclerosis and coronary heart disease in Japan is clearly established. Among Japanese, as among other peoples, the incidence of coro-

nary heart disease is directly related to the average level of serum cholesterol, and it is unnecessary to invoke racial or other factors in explanation.

The serum cholesterol level in Japanese men is directly related to the percentage of calories provided by fats in the diet. The effect of the fats is dominated by the saturated fats of meats and dairy products. Among Japanese, as in most of the world's populations, when the diet is increased in fats, this increase is mainly accounted for by increasing consumption of the more saturated types of fats, as represented in beef, pork and dairy products.

These findings do not constitute proof of the hypothesis that dietary fat is a major factor in the development of coronary heart disease. But the findings are consistent, in detail, with the theory.

The theory is consistent not only with our findings in comparing Japan with the United States—it is consistent also with the results of our studies in North and South Italy, in South Africa, in England, in Spain, in Sweden and, most recently, in Finland.

It is consistent with the findings of others in Guatemala, in Israel, in India, in Nigeria and in West Germany. So far, all investigations on populations subsisting on low-fat diets show such populations to be characterized by a low incidence of atherosclerosis and coronary heart disease and a low average level of cholesterol in the blood in comparison with populations who subsist on high fat diets. All populations known to have an incidence of the disease comparable to that in the United States or in Great Britain obtain at least a third of their calories in the form of fats in which fats from meats and dairy products make a large contribution.

Two exceptions to these rules have been claimed—the Eskimo and the Navajo Indian. On investigation, however, these 'exceptions prove to be based on faulty or absent information, and failure to realize that in both of these small populations the number of men of an age appropriate to the exhibition of coronary heart disease is extraordinarily small. The majority of Eskimos in modern times eat a diet considerably lower in fats than do contemporary Americans, and the few primitive Eskimos who do eat a high fat diet (only slightly higher in fat calories than the diet in the United States) consume very little of the common meat and dairy fats characteristic of the United States and other regions where coronary heart disease is common. In any case, practically nothing is known about the frequency of coronary atherosclerosis and heart disease among Eskimos.

Study of the Navajo Indians does not support the suggestion that the Navajos eat the high fat diet typical of most Americans today, yet suffer no coronary heart disease. Navajo diets are not high in total fats and are very low in dairy fats. The average age of the Navajo population is far lower than that of the United States as a whole (about half of them are 15 years old or younger), and there are no reliable data on the frequency of atherosclerosis or coronary heart disease among them. Arteriosclerotic heart disease and myocardial infarction are not vanishingly rare, and the incidence seems to be roughly what would be expected with a diet of around 25 per cent fat calories, including little or no butterfat. In other words, the Navajos apparently resemble the inhabitants of Sardinia or the Cape colored people of South Africa in these respects.

Changes in Serum Glutamic Oxalacetic Transaminase

MOORE, C. B., BIRCHALL, R., HORACK, H. M., AND BATSON, H. M. (*Am. J. M. Sc.*, **234** : 528, 1958) from the Department of Internal Medicine, Ochsner Clinic, New Orleans, Louisiana, give below the summary of the results of 1284 serum transaminase determinations done in 173 patients and 10 normal subjects :

The results of serial transaminase determinations have been of significant clinical value in diseases of the

A. HEART.

1. Early recognition of necrosis of myocardium in patients seen for the first time with thoracic pain whose electrocardiogram (a) shows only left bundle branch block, (b) is not diagnostic and either an intramural or a subendocardial infarction is suspected, (c) fails to show a pattern characteristic of myocardial infarction, which serves as a clear indication of the need for additional leads with the use of an exploring electrode, (d) fails to show an infarct because it is located in a region inaccessible to the standard commonly used exploring electrodes.

2. Early recognition of myocardial necrosis in localities where competent electrocardiographic interpretation is not immediately available, or in which the exact interpretation of an atypical electrocardiogram is in doubt.

3. Occasional detection of extension of an infarction during observation and treatment of a patient.

4. Differentiation of acute myocardial infarction, acute coronary insufficiency and angina pectoris.

5. Confirmation of the clinical impression that thoracic pain in some patients is of extracardiac origin.

B. Liver.

1. Differentiation of obstructive from hepatocellular jaundice.

2. Presence of activity in parenchymal disease of the liver.

3. Demonstration of relief of obstruction of the common bile duct.

4. Strong evidence that there is no metastasis to the liver in a patient with known carcinoma elsewhere.

C. MUSCULOSKELETAL SYSTEM.

1. Differentiation of dermatomyositis from other collagen diseases.

2. The hitherto unreported observation has been made that the serum transaminase level is elevated in patients with gout as well as in patients with other causes of hyperuricemia (myocardial infarction, leukemia and polycythemia vera). There is apparently no direct relationship between the serum transaminase level and the blood uric acid levels, but further study of this aspect of the problem is underway at present.

CURRENT TOPICS*

BACKGROUND AND PRELIMINARY ORGANIZATION OF THE W.M.A.

In 1926, there was organized an international medical association known as "L'Association Professionelle Internationale des Médecins". Originally, there were 23 national members of this organization. The number dwindled somewhat and at the time of the Second World War, it suspended operations.

During the war, doctors of all the allied nations congregated from time to time at the British Medical Association House and discussed medical problems.

International Medical Conference

In July, 1945, an informal Conference of doctors from several countries was called by the British Medical Association. This small group decided to initiate plans for an international medical organization. Accordingly, a second Conference was held in London in September, 1946. Medical associations of thirty-one countries were invited and twenty-nine sent representatives either as Delegates or Observers. An Organizing Committee was appointed and directed to draft a Constitution and plan for the first General Assembly. This Conference decided that the name of the new organization should be "The World Medical Association" and that it should have broader activities and wider membership than the former L'Association Professionelle Internationale des Médecins. Officers of the A.P.I.M., having attended the Conference, recommended to its membership that it dissolve in favour of The World Medical Association. This recommendation was accepted and A.P.I.M. generously turned over its remaining funds to W.M.A.

The Conference outlined the general aims of the new association and decided that the unit of membership should be the national medical association of the country with all member associations having equal voting power.

It was further agreed by the Conference that a provisional joint Secretariat should be established in London and Paris. Dr. Charles Hill, Secretary of the British Medical Association, was designated as the English Secretary and Dr. Paul Cibrie, Secretary of La Confédération des Syndicats Médicaux Français, as the French Secretary.

Dr. Otto Leuch of Switzerland was designated as temporary Treasurer.

The Organizing Committee

Those named to the Organizing Committee were:

Dr. F. De Court, France
Dr. Pierre Glorieux, Belgium
Dr. Dag Knutson, Sweden
Dr. Otto Leuch, Switzerland
Dr. John A. Pridham, Great Britain
Dr. T. Clarence Routley, Canada
Prof. I. Shawki Bey, Egypt
Dr. Lorenzo Garcia Tornel, Spain
Dr. A. Zahor, Czechoslovakia.

At the first Meeting of the Organizing Committee, Dr. T. C. Routley was named Chairman and Dr. F. De Court, Vice-Chairman.

The second Meeting of the Organizing Committee was held in Paris in November, 1946. Further progress was made on the Constitution and By-Laws and it was decided to invite the American Medical Association to name one of its members to serve on the Organizing Committee.

The American Medical Association accepted this invitation and named Dr. Louis H. Bauer to serve on the Committee and Dr. Elmer L. Henderson to serve as Alternate.

The third Meeting of the Organizing Committee was held in London, April, 1947. The final Draft Constitution and By-Laws was approved; the dues were set at 20 Swiss Centimes per member of the national member association with a minimum subscription of 1,000 and a maximum 10,000 Swiss Francs; and plans were made to hold the First General Assembly in Paris, September, 1947.

The final Meeting of the Organizing Committee was held in Paris the day before the convening of the General Assembly. At this meeting, the American delegation offered to contribute $50,000 a year for five years to facilitate early progress of the Association. After discussion, the Committee voted to recommend that the offer be accepted by the General Assembly subject to the following provisions:

(1) That one of the objectives of the Association should be "to promote world peace";
(2) That the money so contributed be used for the expenses of the headquarters and Secretariat, and the publication of a bulletin or journal;
(3) That the cost should not be more than $50,000 during the first year;
(4) That the headquarters of The World Medical Association should be established in North America;
(5) That the Council of The World Medical Association should appoint the Secretary and other staff; work out a scheme of associate membership; recommend the formation of supporting committees in other countries; prepare plans of development; and
(6) That nothing diminish the authority of the General Assembly for full control of the policy and affairs of the Association.

Conference of Delegates

The Conference of Delegates convened on September 17, 1947 in Paris. After much discussion extending over two days, the Constitution and By-Laws as recommended by the Organizing Committee with minor amendments from the Conference were adopted.

The First General Assembly

With the adoption of the Constitution and By-Laws on September 18, 1947, the Conference of Delegates became the First General Assembly of The World Medical Association which remained in Session through Septem-

* From the First Decade Report of W.M.A.

ber 20, 1947. The objectives of the Association as specified in the Constitution were :

(i) To promote closer ties among the national medical organizations and among the doctors of the world by personal contact and all other means available.
(ii) To maintain the honour and protect the interests of the medical profession.
(iii) To study and report on the professional problems which confront the medical profession in the different countries.
(iv) To organize an exchange of information on matters of interest to the medical profession.
(v) To establish relations with, and to present the views of the medical profession to the World Health Organization, U.N.E.S.C.O., and other appropriate bodies.
(vi) To assist all peoples of the world to attain the highest possible level of health.
(vii) To promote world peace.

Professor Dr. Eugène Marquis, Dean of the Medical Faculty of the University of Rennes, France, was elected as the first President of The World Medical Association. Dr. Jar. Stücklik, of Pragne, Czechoslovakia, was elected President-Elect; Dr. Otto Leuch, Switzerland, was elected Treasurer; Dr. Charles Hill, United Kingdom, was elected as temporary Honorary Secretary. The first Council of ten members of the First General Assembly were elected and The World Medical Association was fully launched, and at once the Association began discussion of a variety of topics.

Structure and Functioning of the Association

The Constitution and By-Laws as adopted provided for membership of those medical organizations represented at the International Medical Conference, London, September, 1946, and for other national medical associations fully representative of the medical profession in their nations or territories, but only one member association from each country.

The membership subscription was to be paid annually, the amount being prescribed by the General Assembly; the subscription due in advance on January first of each year and if not paid by December 31st, the Association was to be dropped as a member of The World Medical Association. No association can voluntarily withdraw except on six months notice to the Council.

The general control of the policy and affairs of the Association was vested in the General Assembly, consisting of the Officers, the Council and the Delegates from member associations. Each member association was entitled to two Delegates, regardless of the member association's size. Provision was made for Alternate Delegates and Observers.

The General Assembly was to meet annually and in a different member country each year, in so far as possible. The business of the Assembly included the receiving of reports and resolutions and acting on them; electing officers, officials and Council members; selecting venues of meetings; admitting new member associations; and instructing the Council.

Election of Officers, Council and officials was governed by the Constitution and By-Laws which provided for a Council consisting of the three elected officers and ten elective members of the General Assembly. Terms of office of the Treasurer and Council members were set at three years. The terms of other officers were one year. All officers and Delegates were required to be medically qualified.

The Council was directed to hold at least two meetings annually. Its duties included carrying out the mandates of the Assembly; administering the affairs of the Association; convening the General Assembly in regular or special sessions; preparing the Assembly agenda; presenting an annual report on the general state and proceedings of the Association and an annual financial report with a budget for the ensuing year; electing its Chairman and Vice-Chairman; and filling casual vacancies among its members.

The official languages of The World Medical Association were declared to be English, French and Spanish.

The Association was to publish a bulletin or journal to be known as the official organ of The World Medical Association.

CONSTITUTION AND BY-LAWS OF THE W.M.A.

1946—1947

IST GENERAL ASSEMBLY

The Constitution of The World Medical Association was adopted on September 18, 1947 in Paris, France.

Amendments to Constitution and By-Laws

Words in parenthesis indicate deletion; words in all capitals indicate substitution.

1947—1948

IIND GENERAL ASSEMBLY

By-Law 15, (i), (ii) and (v) :

(i) To elect (or) AND install a President of the Associaton.
(ii) To elect (a President-Elect) a Treasurer and such other officers as by the Articles and By-Laws may require to be so elected.
(v) To appoint a place and time at which the next annual meeting shall be held; AND TO ELECT A PRESIDENT-ELECT.

By-Law 29. *Council—Term of Office* :

29. Each elected member of the Council appointed by the General Assembly shall hold office for three years and at the end of that term shall be eligible for re-election. Members shall retire in rotation. At the first annual meeting four members shall be elected for three years, three for two years, and three for one year.

IF, HOWEVER AN OFFICER OR A MEMBER OF THE COUNCIL CEASES TO BE A MEMBER OF HIS NATIONAL MEDICAL ASSOCIATION, OR HIS NATIONAL MEDICAL ASSOCIATION CEASES TO BE A

MEMBER OF THE WORLD MEDICAL ASSOCIATION, OR HE IS ABSENT FROM TWO CONSECUTIVE MEETINGS OF THE COUNCIL WITHOUT LEAVE FROM THE COUNCIL HIS PLACE SHALL BE DEEMED VACANT.

By-Law 37. *Vacancies* :

37. The Council shall have power to fill casual vacancies among its number until the next election of members of the Council.

WHEN A MEMBER OF THE COUNCIL IS UNABLE TO ATTEND A MEETING, THE CHAIRMAN SHALL HAVE THE POWER TO AUTHORIZE THE ATTENDANCE OF A DEPUTY APPROVED BY THE CHAIRMAN.

By-Law 42. *Qualifications* :

42. (A delegate shall be a person who is medically qualified and a member of the association he represents, and he shall be ordinarily resident in the territory of that association).

AN OFFICER OF THE ASSOCIATION, A DELEGATE, ALTERNATE DELEGATE OR AN OBSERVER FROM A MEMBER-ASSOCIATION SHALL

(i) HOLD A DIPLOMA OR DEGREE IN MEDICINE RECOGNIZED BY THE NATIONAL MEDICAL ASSOCIATION OF HIS COUNTRY;
(ii) BE LICENSED TO PRACTICE IN THAT COUNTRY;
(iii) BE A MEMBER OF HIS NATIONAL MEDICAL ASSOCIATION; AND
(iv) EXCEPT IN THE CASE OF OBSERVERS, ORDINARILY BE RESIDENT IN THE TERRITORY OF THAT ASSOCIATION.

1948—1949

IIIRD GENERAL ASSEMBLY

By-Law 19. *Voting* :

19. All members of the General Assembly shall be entitled to vote at meetings of the Assembly provided that, except in the election of officers, a member of Council shall not be entitled to vote in the Assembly unless he is also a delegate. Each delegate shall have one vote, provided that if a member-association is represented in a meeting of the General Assembly by only one delegate that delegate shall have two votes.

IF A MEMBER-ASSOCIATION IS UNABLE TO SEND A DELEGATE TO THE GENERAL ASSEMBLY, IT MAY AUTHORIZE THE DELEGATION OF ANOTHER MEMBER-ASSOCIATION TO REPRESENT IT, PROVIDED, HOWEVER, THAT NO DELEGATION MAY REPRESENT MORE THAN ONE MEMBER-ASSOCIATION IN ADDITION TO ITS OWN AND SUCH AUTHORIZATION SHALL INCLUDE ONLY ONE ADDITIONAL VOTE, AND PROVIDED FURTHER THAT THE MEMBER-ASSOCIATION AUTHORIZING ANOTHER MEMBER-ASSOCIATION TO REPRESENT IT MUST FURNISH THE SECRETARY GENERAL SUCH AUTHORIZATION IN WRITING SIGNED BY THE PROPER OFFICIAL OF THAT ASSOCIATION.

THIS PROCEDURE SHALL TAKE EFFECT WHEN ADOPTED BY THE GENERAL ASSEMBLY AND SHALL REMAIN IN EFFECT ONLY THROUGH THE SESSION IMMEDIATELY FOLLOWING ITS ADOPTION, SUBJECT TO FURTHER RENEWAL IF THE CIRCUMSTANCES WARRANT.

1949—1950

No amendments.

1950—1951

VTH GENERAL ASSEMBLY

Article 8. *General Assembly* :

8. The general control and direction of the policy and affairs of the Association shall be vested in the "General Assembly", which shall be composed of the officers AND PAST PRESIDENTS of the Association, *ex officio*, the members of the Council, and delegates from the member associations.

By-Law 19. *Voting* :

19. All members of the General Assembly shall be entitled to vote at the meetings of the Assembly provided that, except in the election of officers, a member of Council shall not be entitled to vote in the Assembly unless he is also a delegate. Each delegate shall have one vote, provided that if a member-association is represented in a meeting of the General Assembly by only one delegate that delegate shall have two votes.

PAST PRESIDENTS SHALL HAVE THE PRIVILEGES OF THE FLOOR BUT SHALL NOT BE ENTITLED TO VOTE.

Paragraphs 2 and 3 as adopted at the IIIrd General Assembly, 1948-1949 follow this amendment.

By-Law 44. *Expenses* :

44. The expenses of delegates AND PAST PRESIDENTS attending meetings of the General Assembly shall not be a charge upon the funds of The World Medical Association.

1951—1952

VITH GENERAL ASSEMBLY

By-Law 7. *Arrears* :

7. If the subscription of a member-association for any year shall not have been paid on or before 31st December of that year it shall *ipso facto*, but without prejudice to its liability to the Association, cease to be a member as from that date, provided that, upon payment before 31st March in the succeeding year of all subscriptions due from it, it shall, if eligible, be restored to membership without re-election.

THE COUNCIL SHALL HAVE THE AUTHORITY TO DEFER OR WAIVE PAYMENT OF DUES OF ANY MEMBER-ASSOCIATION IN CASE OF FINANCIAL HARDSHIP.

1952—1953

No amendments.

1953—1954

VIIITH GENERAL ASSEMBLY

Article 15. *Council* :

15. The General Assembly shall appoint at each annual meeting a Council which shall be composed of the President, the President-Elect, and the Treasurer, all *ex officio* and (ten) ELEVEN members of the General Assembly elected in the manner and for the period prescribed in the By-Laws.

By-Law 29. *Council—Term of Office* :

29. Each elected member of the Council appointed by the General Assembly shall hold office for three years and at the end of that term shall be eligible for re-election. Members shall retire in rotation. (At the first annual meeting four members shall be elected for three years, three for two years and three for one year.) AT THE ANNUAL MEETING IN 1954 FOUR (4) MEMBERS SHALL BE ELECTED FOR THREE (3) YEARS. IN 1955 THREE (3) SHALL BE ELECTED FOR THREE (3) YEARS : AND THEREAFTER FOUR (4) SHALL BE ELECTED EXCEPT EVERY THIRD YEAR WHEN ONLY THREE (3) SHALL BE ELECTED.

If, however an officer or a member of the Council ceases to be a member of his national medical association, or his national medical association ceases to be a member of The World Medical Association, or he is absent from two consecutive meetings of the Council without leave from the Council, his place shall be deemed vacant.

OF THE ELEVEN (11) ELECTIVE MEMBERS OF THE COUNCIL, AT LEAST THREE (3) SHALL COME FROM EUROPE AND AFRICA; AT LEAST ONE (1) FROM ASIA; AT LEAST ONE (1) FROM THE PACIFIC AREA; AT LEAST ONE (1) FROM LATIN AMERICA AND AT LEAST ONE (1) FROM NORTH AMERICA. THE OTHER FOUR (4) MAY BE ELECTED FROM ANY OF THESE AREAS. THE ASSIGNMENT OF COUNTRIES TO THE VARIOUS AREAS SHALL BE AS PRESCRIBED IN THE STANDING ORDERS.

By-Law 7. *Arrears* :

7. IF THE SUBSCRIPTION OF A MEMBER-ASSOCIATION FOR ANY YEAR SHALL NOT HAVE BEEN PAID BY THE TIME OF THE CONVENING OF THE GENERAL ASSEMBLY FOR THAT YEAR, THE MEMBER-ASSOCIATION SHALL NOT BE CONSIDERED IN GOOD STANDING AND IT SHALL BE DEPRIVED OF VOTING PRIVILEGES AT THAT GENERAL ASSEMBLY.

If the subscription of a member-association for any year shall not have been paid on or before 31st December of that year it shall *ipso facto*, but without prejudice to its liability to the association, cease to be a member as from that date, provided that, upon payment before 31st March in the succeeding year of all subscriptions due from it, it shall, if eligible, be restored to membership without re-election. The Council shall have the authority to defer or waive payment of dues of any member-association in case of financial hardship.

1954—1955

IXTH GENERAL ASSEMBLY

By-Law 18. *Presiding Officer* :

18. The President of the Association shall NORMALLY preside at meetings of the General Assembly. In the absence of the President, the (meeting) GENERAL ASSEMBLY shall appoint a presiding officer from its own number.

THE PRESIDENT, IF HE SO DESIRES, SHALL HAVE THE AUTHORITY, AFTER CONSULTATION WITH THE COUNCIL, TO APPOINT ANOTHER MEMBER OF THE GENERAL ASSEMBLY TO PRESIDE OVER THE BUSINESS SESSIONS OF THE GENERAL ASSEMBLY. SUCH APPOINTMENT SHALL BE MADE FROM AMONG THOSE WHO HAVE SERVED AS AN OFFICER, A MEMBER OF COUNCIL OR COUNCIL COMMITTEE, OR AS A DELEGATE TO AT LEAST THREE GENERAL ASSEMBLIES, AND WHO IS EXPERIENCED IN PARLIAMENTARY PROCEDURES. SUCH APPOINTMENT SHALL BE SUBJECT TO CONFIRMATION BY THE GENERAL ASSEMBLY.

By-law 32. *Meetings* :

32. The Council shall meet at least twice a year and at such times as it may deem necessary. Meetings shall be held at such place and upon such notice as the Chairman may appoint.

IF THE COUNCIL CANNOT BE CONVENED AS A WHOLE, EITHER DUE TO FINANCIAL OR OTHER EMERGENCY REASONS, THE CHAIRMAN OF COUNCIL AND THE SECRETARY GENERAL SHALL BE EMPOWERED TO CONVENE THOSE MEMBERS OF COUNCIL WHOSE PRESENCE IS DEEMED TO BE INDISPENSABLE IN TRANSACTING THE BUSINESS ON THE AGENDA. ANY DECISIONS TAKEN AT SUCH A MEETING, WITH THE EXCEPTION OF THOSE EMERGENCY MATTERS REQUIRING IMMEDIATE ACTION, SHALL BE SUBMITTED BY MAIL TO MEMBERS OF COUNCIL FOR APPROVAL PRIOR TO THEIR IMPLEMENTATION.

1955—1956

XTH GENERAL ASSEMBLY

Article 5. *Membership* :

5. The following national medical associations shall be eligible for membership :

(i) Those medical associations which sent delegates or observers to the International Medical Conference in London in September, 1946;

(ii) Any (other) national (or territorial) medical association which is (fully) MOST representative of the (medical profession in its country or territory or of the members) PROFESSIONAL INTERESTS of the medical profession (of a recognized ethnic group) in (its) EACH country. (or territory).

By-Law 2:

"2. Only one national medical association shall be recognized in each (country) NATION. (Unless the General Assembly by a majority of two-thirds of the delegates present and voting shall decide to accept an additional association as a member).

MEMBERS OF THE W.M.A.

FOUNDER MEMBER ASSOCIATIONS

1947

Australia—Federal Council of the British Medical Association in Australia.
Austria—Osterreichische Arztekammer.
Belgium—Fédération Médicale Belge.
Canada—Canadian Medical Association.
China—Chinese Medical Association (dropped 1952) (see 1954).
Czechoslovakia—Ustrédní Jednota Cëskych Lékaru (ceased to exist 1948).
Denmark—Den Almindelige Danske Laegeforening.
Eire (Ireland)—Medical Association of Eire (Changed to Irish Medical Association).
France—La Confédération des Syndicats Médicaux Français.
Great Britain—British Medical Association.
Greece—Association Médicale Panhelleniqne.
Iceland—Laeknafelag Islands.
India—Indian Medical Association.
Israel—Israel Medical Association (see Palestine).
Italy—Federazione Nazionale delgi Ordini dei Medici d'Italia.
Luxembourg—Syndicats des Médecins du Grand Duché de Luxembourg.
Netherlands—Koninklijke Nederlandsche Maatschappij tot Bevordering der Geneeskunst.
Norway—Den Norske Laegeforening.
Palestine—Palestine Arab Medical Association (ceased to exist 1949). Palestine Jewish Medical Association—name changed to Israel Medical Association in 1949.
Poland—Naczelna Izba Lekarska (dropped 1949).
South Africa—Medical Association of South Africa.
Spain—Colegio Official de Médicos de Espafia.
Sweden—Sveriges Läkärforbund.
Switzerland—Fédération des Médecins Suisses.
Turkey—Turkish Medical Chamber, later replaced by The Union of Turkish Physicians.
United States of America—American Medical Association.

PROVISIONAL MEMBERS 1947

REGULAR MEMBERS 1948

Bulgaria—Association des Médecins de Bulgarie (dropped 1951).
Chile—Colegio Médico de Chile.
Columbia—Federación Médica Colombiana.
Cuba—Colegio Médico Nacional de Cuba.
Dominican Republic—Asociación Médica Dominicana, Inc.
Ecuador—Federación Médica del Ecuador.
Finland—Suomen Laakariliitto.
Guatemala—Federación Médica de Guatemala.
Hungary—Hungarian Medical Association (dropped 1949).
New Zealand—New Zealand Branch British Medical Association (withdrew 1951, reelected 1956).
Pakistan—Pakistan Medical Association.
Peru—Federación Médica del Peru.
Philippines—Philippine Medical Association.
Portugal—Ordem dos Medicos.

1949

Egypt—The Egyptian Medical Association (formerly Royal Egyptian Medical Society).
Panama—Asociación Médica Nacional.
El Salvador—Colegio Médico de El Salvador.

1950

Ethiopia—Ethiopian Medical Association (dropped 1955).
Thailand—Medical Association of Thailand.

1951

Germany (Federal Republic)—Arbeitsgemeinschaft der Westdeutschen Arztekammer (name changed in 1955 to Bundesarztekammer).
Haiti—Association Médicale Haitienne.
Japan—Japan Medical Association.
South Korea—Korean Medical Association.

1952

Yugoslavia—Union des Sociétés Médicales de Yugoslavie.

1953

Brazil—Asociaciao Medica Brasileira.
Indonesia—Ikatan Doktor Indonesia.
Liechtenstein—Liechtensteiner Aerzteverein.

1954

Argentina—Confederación Médica de la Republica Argentina.
Burma—Burma Medical Association.
China (Nationalist of Formosa)—China Medical Association.
Sudan—Sudan Medical Association.

1955

Morocco—Confédération des Syndicats Médicaux du Maroc.
Vatican State—Associazione Medica delo Vaticano.
Venezuela—Federación Médica Venezolana.

NOTES AND NEWS

Eleventh World Health Assembly

The Eleventh World Health Assembly has concluded its three-week session in Minneapolis (Minnesota, U.S.A.).

The 1959 public health programme, adopted by the Assembly, includes nearly 800 projects in nearly every country and territory in the world. To finance it the Assembly adopted unanimously its largest budget to date —$14,287,600. The Organisation is called upon to direct its health programme more than ever towards a primary objective of WHO—the strengthening of national public health services. Here are some of the highlights of the Assembly :

Malaria eradication is now under way in 16 countries, embracing nearly one-third of the world's population. It was stressed, however, that much greater international financing is essential to bring to a successful conclusion this first concerted effort to eradicate a major disease from the whole world in a relatively short period of time. So far, a little over $5,000,000 has been contributed to WHO's Malaria Eradication Special Account, an amount only sufficient to complete this year's programme.

The Assembly authorised the Director-General to seek funds for malaria eradication not only from governments, but from all possible sources including foundations, industry, labour organisations, institutions and individuals. The Soviet Union delegate announced that his Government was giving 100,000 tons of DDT to WHO in furtherance of this programme. He also stated that the USSR could make available technically qualified experts.

WHO was requested to promote further research particularly regarding the development of mosquito resistance to insecticides.

Research : The Director-General was requested to "organise and arrange for a special study of the role of the Organisation in research and of ways in which WHO might assist more adequately in stimulating and co-ordinating research and developing research personnel". For this purpose the Government of the United States is making available some $300,000 to WHO to set up studies for ways and means by which research can best be promoted.

Atomic energy : On the question of the health aspects of the peaceful uses of atomic energy the Assembly requested the Director-General to investigate concrete measures for dealing with this problem.

The Assembly action, based on a proposal made by the USSR, joined by the USA and 21 other sponsoring countries, opens the way for the Director-General to aid under-developed countries in the use of radioactive isotopes in medicine; and for a study to be made on the effect of radiation on human heredity and the relationship of radiation to health in general.

Smallpox : The Director-General was requested to study the possibilities and the practical implications involved in a universal smallpox eradication programme and to report his findings to the WHO Executive Board meeting in January 1959. Meanwhile, governments throughout the world are urged to continue the fight against smallpox with vaccination and revaccination campaigns, and medical scientists are called upon to work towards the production of improved smallpox vaccine resistant to high temperatures.

It was announced that the USSR is giving 25,000,000 doses of smallpox vaccine to WHO, and that the Cuban Government has offered 2,000,000 doses of vaccine annually to the Organisation.

WHO's finances : The fact was stressed that, from an initial membership of 26 countries in 1948, WHO had grown to 88 in a decade. From a 1948 budget of $5,000,000, there had just been voted a regular budget of nearly $14,300,000. To this should be added a supplemental $6,000,000 from UN Technical Assistance funds, and nearly $9,000,000 contributed so far to the special malaria eradication funds of both WHO and its regional office in the Americas, the Pan American Sanitary Bureau. In considering the total international resources made available to WHO-assisted programmes, one should also add the important UNICEF allocations of material supplies to the governments concerned.

The External Auditor's report for 1957 revealed that in the past year the collection of contributions from active member countries reached 97·08 per cent—the highest in WHO's history.

Impressions of Leader of Indian Delegation

Dr. A. Lakshmanaswami Mudaliar, who led the Indian Delegation to the 11th World Health Assembly at Minneapolis (United States), returned to Madras on June 20.

Giving his impressions of the Assembly session, Dr. Mudaliar said : "There was a general atmosphere of cordiality and earnestness at the conference, which augured well for the future of world health."

The World Health Assembly, which started on May 28 was preceded by the tenth anniversary of the WHO, which was held on May 26 and 27. Several delegates made complimentary speeches about the work of the organisation and the beneficial effect it has had on many countries of the world. A message from the President of U.S.A. announced a donation of $300,000 for the Organisation to carry out researches in the field of public health.

Dr. Mudaliar said the session of the World Health Assembly was noteworthy for some important developments. A budget of $15 million for the year was unanimously passed. It was decided that in regard to eradication of malaria, the programme should be quickened and for this purpose donations should be obtained from member countries. India, Dr. Mudaliar said, had already a large malaria eradication programme, which will cost her nearly $40 million in the next two or three years. With the help of the UNICEF Technical Assistance Programme, he said, it would be possible to carry out the programme in India successfully. The Soviet delegate announced on behalf of his Government the offer of 100,000 tons of DDT towards this purpose.

Another significant resolution was with regard to eradication of smallpox. It was decided that they should embark on a programme of mass vaccination and re-

vaccination programme so as to completely eradicate the disease. The next important resolution was environmental sanitation. It was thought that supply of potable water should be ensured and that the emphasis must be laid on rural planning as much as town planning.

Another important resolution sponsored jointly by the U.S.A. and the USSR dealt with the use of atomic energy for peaceful purposes and this resolution was also unanimously passed.

Dr. Mudaliar said that he along with the Director of the African Region and the Soviet delegates were specially invited to address the conference in Rochester, New York, and the subject of their address was on the problems of world health. As a result of the conference, he said, the American public were educated on the work done by the WHO and its achievements in the field of public health all over the world.

General Assembly of the W.M.A.

The 12th General Assembly of the World Medical Association will be held on August 15-20, 1958 at the Parliament House, Copenhagen, Denmark, under the patronage of His Majesty, Frederick IX, King of Denmark.

The programme includes the following special topics : I. Health Education of the Public. II. Problems of Doctors in Hospitals and Policlinics. III. The Health Team and the Challenge of World Unity. IV. Nuclear Radiation and the Health Education of the Public. V. Scientific Programme including (A) The Danish Programme of Cancer Control and Eradication; (B) Treatment to Reduce Mortality from Toxic Effects of Soporific Drugs and (C) Permanent Sequela from Malnutrition.

Dr. S. C. Sen of Delhi, a Past President of I.M.A. and Secretary-in-charge of W.M.A. in Asia is expected to attend these meetings on behalf of the I.M.A.

The topic at the Medical Editors' Meeting is Medical Publications as a Responsibility of the Medical Associations.

Outstanding medical motions pictures will be presented at the General Assembly.

President's Message on Malaria Control Programme

President Rajendra Prasad has expressed his appreciation of the efforts of those who had contributed to the success of the nationwide operation for the control of malaria started five years ago.

The President in a message in connection with the malaria eradication publicity week (June 23-28) organised throughout the country, wished godspeed "to all those engaged in this colossal task of prime national importance—the eradication of malaria."

The President in his message says : "Five years ago we embarked on a nationwide operation for the control of malaria, the ravages of which were telling not only on the health of our people but also on economic conditions. The success that has attended this national malaria control programme has paved the way for the adoption of more intensive and extensive operations included in the national malaria eradication programme, which is now being taken in hand.

"It is always a matter of gratification to see the successful completion of one phase and the commencement of a new phase of a national measure of immense benefit to the citizens of this country."

Malaria Eradication : Health Minister's Appeal

Mr. D. P. Karmarkar, Union Health Minister, has issued the following appeal in connection with the Malaria Eradication Publicity Week.

"Malaria has been the most formidable health problem facing the country from time immemorial. Control of this disease was, therefore, taken up as a top priority project among the public health programmes in the first Five-Year Plan. The National Malaria Control programme, the biggest project of its kind in the world, was inaugurated in April, 1953, and has made, I am glad to say, considerable headway. Nearly 15 crore people had been protected against malaria up to the end of 1956-57, and there has been a spectacular reduction in the incidence of this disease.

"I am glad that Malaria Eradication, which only a few years ago was but a dream, has now become a practical possibility. Its achievement will surely go down as a memorable legacy to the coming generations.

"Our purpose in holding a publicity week is to focus the attention of the public on the scope, magnitude and the modus operandi of the eradication programme, so that they may extend their co-operation which is so necessary for the attainment of the objective—'Eradication of Malaria'.

"I take this opportunity of conveying our sense of thanks and appreciation to the United States Technical Co-operation Mission who have agreed to contribute a large sum for the foreign exchange requirement. Our thanks are also due to the World Health Organisation, who have also agreed to support our programme. The fight against malaria is a good example of international co-operation in the field of health. I am quite sure that our countrymen will tender all co-operation in this large national effort which means so much for us and for the future generations."

T.C.M.'s Aid to India for Purchase of D.D.T.

An agreement was signed in New Delhi on June 20 between the Government of India and the U.S. Technical Co-operation Mission, under which a sum of $3,260,000 (Rs. 1·5 crores) would be made available to India for the purchase of 5,250 long tons of D.D.T.

Result of National Malaria Control Programme

A fall of about 66 per cent in the incidence of malaria has been recorded in the course of two years from 1953-54 to 1956-57 as a result of the National Malaria Control Programme started in April 1953. The incidence of malaria in 1953-54 was 63 million. By 1956-57, it fell to 21 million.

In 1956-57, the programme covered a population of 19·53 million as against 13·72 million in 1953-54. The Central Government spent from 1953 to 1958 a sum of Rs. 297·30 lakhs towards controlling the disease.

Malaria accounted for a loss of about Rs. 1,000 crores annually to India in agricultural production and man-hours according to an assessment made in 1953.

Set up in April 1953, the National Control Programme reduced malaria cases by 50 per cent in the first year. From April 1, 1958 it has been decided to convert the programme to one of eradication of malaria. This was calculated to be ultimately cheaper than continued control measures. In about six years, the programme will cover almost the entire population of the country. It aims at reducing the parasite reservoir in human beings to such a negligible degree that once that has been achieved, there will be no danger of resumption of local transmission.

There are two phases of the programme. The attack phase, and maintenance or surveillance phase. During the attack phase, the central idea is to spray twice a year every human habitation and cattle shed in the areas where malaria is endemic. Estimates show that 23 crore people live in such areas and 230 units, each designed to protect 10 lakh people, will be operating therein. Intensive insecticide spraying will be carried out for three consecutive years from 1958-59 to 1960-61.

Sixteen crores of people living in areas where malaria transmission is known to occur in such a low degree as not to constitute a health problem, would be protected under the Eradication Programme. All such areas will be brought within the ambit of spraying operations for two years from 1960-61 when 160 additional units will be established to cover them. Only one round of spray will afford adequate protection in these areas. Thus by 1960-61, the entire country will be covered by the spraying operations.

During the surveillance phase, a special staff will help watch for cases when spraying operations are decided to be interrupted. The important factor of the phase is that the surveillance staff will go into operation by 1960-61, i.e., one year prior to the contemplated interruption of spraying. The data covered will help determine the advisability of stopping spraying operations during the next season. Even where this is done, vigilance will continue for a further period of three years. After this the responsibility for surveillance will fall on the local public health administration.

The estimated cost of the eradication programme during the current and next Plan period will be about Rs. 63·24 crores whereas a control programme for the same period is expected to cost about Rs. 52·02 crores.

The eradication programme does not aim at eradication of mosquitoes, which may continue to thrive, with this difference that they will cease to be the transmitters of malaria infection.

For supply of D.D.T., which is one of the principal insecticides used in the control and also the eradication programme, a D.D.T. plant, jointly sponsored by the U.N.I.C.E.F., W.H.O. and the Government of India, has been set up at Delhi in 1955 at a cost of Rs. 40·33 lakhs, with a production capacity of 700 tons of D.D.T. annually. To meet the increased demand for D.D.T. under the eradication programme, it is proposed to step up the capacity of the plant to 1,400 tons annually. A second plant at Alwaye is under construction.

U.N. Report on World Population

The population of the world is increasing so rapidly that there will hardly be enough land to live on in 600 years' time, according to a United Nations report published on June 29.

The report—*The Future Growth of World Population*—noted that estimates for the second half of this century were considerably higher than had been envisaged earlier, with the population of the world rising from its present 2,737 million to 4,000 million by 1980, and reaching 6,000 or 7,000 million by the turn of the century.

While it took 200,000 years for the world's human population to reach 2,500 million, the report declared it would now take a mere 30 years to add another 2,000 million. With the present rate of increase, it could be calculated that in 600 years the number of human beings on earth would be such that there would be only one square metre for each to live on. "It goes without saying that this can never take place. Something will happen to prevent it." The one square metre would include Arctic wastes, deserts and mountain tops, the report added.

Remarking that these figures could have "grave implications for the planning of the economic and social well-being of the future generations," the report said that, less than 100 years ago, there were about 1,250 million people in the world and even that figure was two or three times higher than ever before.

Now the total was twice as high with the prospect that it may double or even triple by the year 2,000.

Even if the present rate of growth should drop—and it was still increasing—world population would not stop growing until it had reached 10,000 to 25,000 million, the report stated.

"One cannot say that such growth is utterly impossible, but the vast changes in human organisation required to sustain it can hardly be conceived at the present time," the report said.

A disturbing feature of population estimates, the report declared, was that a total of 6,000 million or 7,000 million would be attained so soon.

"At the time of writing, the year 2,000 is no further in the future than the year 1914 is in the past." It said: "Not only technical achievement but progress in international co-operation and organisation will have to be more effective than during the past 43 years if the expected numbers of mankind are to be organisationally and technologically accommodated to the minimum conditions required for human dignity."

One of the reasons why population estimates have increased since previous studies made in 1951 and 1954 is because of the 1953 census on the Chinese mainland, the results of which have now been made known. Previously, the official estimate of the Chinese population (including Taiwan) was 463 million, but it is now known that in 1953, there were 583 million people on the mainland.

The report said: "It is estimated that the population of most continents and of the world as a whole is likely to be quadrupled in the course of our century. The ex-

ceptions are Europe (including the Soviet Union) whose population, nevertheless, more than doubles, and Latin America whose population is likely to increase.

"Because of the declining mortality population increase will probably be accelerated through the century in Africa, Latin America and Asia, even if it is admitted that, after 1975 fertility may decline."

Latin America's share in the world population, the report alded, would increase throughout the century outstripping the populations of both North America and Asia.

There would be a "continuous decline in the relative importance of Europe, including the Soviet Union." Early this century, there was one European for every two Asians. By the end of the century, this ratio may have become one to four.

The report, after stating that the rapid increase in the world's population posed a problem of the first order, added that policies aimed at slowing down increases in population recently advocated by India and the Chinese People's Republic deserved "the closest attention of the rest of the world."

"Where population threatens to outstrip resources, the only alternative to fertility would seem to be an eventual return to permanently high mortality. Emigation, at the most, can be only a temporary relief," the report said.

The report concluded by declaring: "As long as it was a question of increasing the population, we were part of the stream followed by evolution during millions of years. Faced with the problem of checking the growth, we are swimming against the tide and, in extremity, having discovered how to increase the flood waters, we now also possess the means of arresting them.

"It now depends on us whether this awakening of consciousness within the stream of life ends in failure or success."

International Atomic Energy Agency

Final preparations for the Second Session of the General Conference of the International Atomic Energy Agency (IAEA) were made by the Board of Governors at its sixth series of meetings commenced at the Agency headquarters in Vienna on 16 June.

It is the constitutional task of the Board to submit to the General Conference a programme of work and budget for the ensuing year. An eight-member committee of the Board has already considered the programme and budget proposals in detail and its findings form the basis of the Board's deliberations.

The Board of Governors also has the duty to present an annual report to the General Conference on the affairs of the Agency, as well as to submit a report which the Agency is required to make annually to the General Assembly of the United Nations. Another committee has given preliminary consideration to these reports which will come before the Board at the current series of meetings.

The present composition of the Board of Governors is: Argentina, Australia, Brazil, Canada, Czechoslovakia, France, Guatemala, India, Indonesia, Italy, Japan, Korea, Pakistan, Peru, Portugal, Romania, Sweden, South Africa, Turkey, USSR, United Arab Republic, United Kingdom and USA.

Registration of Medical Specialists in National Register of Scientific and Technical Personnel

The officer on Special Duty, Council of Scientific and Industrial Research, National Register, Old Mill Road, New Delhi, has informed that the National Register of Scientific and Technical Personnel is being compiled and maintained by it. One can find the standard of qualification prescribed for personnel in different categories for registration in the National Register in a general circular issued. In the first instance, only the specialists in the medical field are being registered. The general definition laid down for this purpose is as follows:

(*a*) Those medical personnel who have received post-graduate degree or diploma or holding recognised Membership or Fellowship for their specialised attainments.

(*b*) Research degree or diploma in medical subjects.

Registration cards and instruction sheets have been sent to all State/Territorial Branches of the I.M.A. Specialists should approach branches for the cards and instruction sheets and extend co-operation to the registration.

College of Physicians and Surgeons of Bombay

According to the intimation received from the General Medical Council of United Kingdom, the Membership (M.C.P.S.) Diploma of the College of Physicians and Surgeons of Bombay has been accorded recognition by that Council for purposes of registration in United Kingdom provided the same is granted after 30th April, 1944 to persons who have undergone a course of study at the Grant Medical College, Seth G. S. Medical College or the Topiwala National Medical College, Bombay.

Indian Council for Child Welfare

The Meetings of the Executive Committee and General Body of the Indian Council for Child Welfare were held some time back in New Delhi.

In her welcome address, Rajkumari Amrit Kaur, President of the Council, urged the Council and all its affiliated State Councils to investigate the needs of child welfare work in the country and emphasised: "We should start on this project right now so as to be able to get our programme incorporated in the third Five Year Plan."

Emphasising the need for placing the ICCW in a position whereby it will be able to carry on its work without the depressing burden of financial anxiety under which it now labours, Rajkumari Amrit Kaur stated "Ad hoc grants are insufficient for any agency which is expected to function as we would all like the Council to function. If child welfare becomes part and parcel of our national development plans, I see no reason whatsoever why funds for a vital work should also not be forthcoming."

Addressing the meeting Smt. Indira Gandhi, Vice-President, ICCW, said, "Children are still far from being

the first priority in Governmental planning or even in their thinking. This is evident from the fact that there is no planning for children on a nationwide basis.

Smt. Gandhi pointed out that apart from the task of planning child welfare work, the Council has the great responsibility of bringing into being uniform children's laws in the country. Several States in the country, Mrs. Gandhi disclosed, still had no children's laws, only three States had comprehensive legislation and the minimum institutions to support that legislation.

Smt. Gandhi emphasised that the ICCW must take up the issue of proper institutional care as part of its programme of active work for this coming year.

Commonwealth Chest Conference

The Minister of Health, Mr. Derek Walker-Smith, said in London on July 1, that recent advances had brought the eradication of tuberculosis increasingly within the range of possibility.

At the inaugural meeting of the Commonwealth Chest Conference, the Minister said in the last 10 years since the National Health Service began, new cases of tuberculosis had fallen in England and Wales by 38 per cent and death by 78 per cent. Medical care was only one of the factors contributing to the improved position. More effective treatment, better housing, higher nutritional standards, and improved economic conditions had all played a part.

"More and more we are shifting the emphasis in anti-tuberculosis work from the curative to the preventive aspect."

Family Planning Work in Rural and Urban Areas

Half-yearly progress reports received from 89 urban family planning clinics and 10 rural clinics in different States reveal that there was an attendance of 22,327 patients at the urban and 5,529 at the rural clinics. The average monthly attendance per clinic was about 42 in urban areas and 92 in rural areas.

An analysis of preference for family planning methods shows that in the urban areas 50 per cent seem to use chemical contraceptives while in the rural areas, the preference seems to be for safe periods and foam tablets.

In the month of May 1958, 3 clinics were opened, one in the rural areas and 2 in urban areas, bringing the total of rural clinics to 332 and urban clinics to 294. The total number of clinics opened so far is 626.

During the month of April and May 1958, an amount of Rs. 57,303 has been sanctioned to various agencies for opening family planning clinics. Of this, Rs. 5,268 was sanctioned to State Governments, Rs. 23,299 to local bodies and Rs. 34,003 to voluntary organisations. A fourth course of training in family planning, training, demonstration and experimental centre, Ramanagram, was conducted in May, and 19 trainees, including two doctors, two health visitors, 6 senior health inspectors and 9 junior health inspectors from the medical and public health department of Mysore were admitted. A short-term training course was conducted in Manipur by the touring training team of the Family Planning Association in India, Bombay. Thirty-five persons, including 8 doctors, 6 nurses and 5 auxiliary nurses, 8 midwives and 8 social workers, were trained. The total number of persons so far trained in family planning during the Second Plan period is 640.

In the sphere of research, a grant of Rs. 15,000 was sanctioned to the Director, All India Institute of Hygiene and Public Health, for continuation of research on the use of synthetic meta-zylohydroquinine as an oral contraceptive. The Demographic Centre at the Delhi School of Economics was sanctioned a grant of Rs. 18,280, while an amount of Rs. 32,670 was sanctioned to the Demographic Training and Research Centre, Bombay.

Orientation Course in Family Planning

An orientation course in Family Planning for doctors under the Contributory Health Service Scheme is being organized in the Lady Hardinge Medical College, New Delhi, from June 20.

The purpose of the orientation scheme is to familiarise medical men working under the Contributory Health Service scheme with recent developments in the field of family planning, so that they could, in the course of their normal duty, give family planning advice to those who seek it. It is considered that for effective implementation of the family planning programme, dissemination of information in family planning as widely as possible is necessary.

During the orientation course, which will last for about a month, trainees will hear talks from experts and others on family planning, on the role of social medicine in family planning, group dynamics, methods of conception control, sterilisation and community education in family planning.

Family Planning is not yet generally a subject which is taught in the training institutions for medical personnel. Medical training institutions have been urged to include the subject in their training programmes and hundred per cent financial assistance has been offered to them by the Government of India for opening Family Planning Clinics. Training centres have been opened in Bombay and Ramanagram, and a grant for a touring training team has been given to the Family Planning Association. Proposals to open regional training centres and additional touring training teams are also under consideration.

Lady Tata Memorial Trust Scholarships and Grants

On the death anniversary of Lady Meherbai Dorabji Tata, the trustees of the Lady Tata Memorial Trust announced the awards of scholarships and grants for the year 1958-59.

International awards of varying amounts, totalling £5,080 for research in diseases of the blood, with special reference to leucaemias, are made to Doctors M. Seligmann (France), M. Simonsen (Denmark), A. J. Therkelsen (Denmark), B. G. Thorell (Sweden), M. Besis (France), G. Klein (Sweden), Mr. A. Pillai (Switzerland) and Dr. J. Ponten (Sweden).

Indian scholarships of Rs. 250 per month each for one year for scientific investigations having a bearing on the alleviation of human suffering from disease are awarded to Dr. Miss Habib Bano (Lucknow), Dr. (Miss) Satwant

Kaur Sokhi (Madras), Miss M. H. Ganghi (Bombay), Mr. P. Suryanarayan Murthy (Bangalore), Dr. Inder Perkash (Lucknow), Miss S. Saroja (Bombay) and Mr. N. L. Tikotkar (Bombay).

The trustees of the Lady Meherbai D. Tata Uthamna Fund Trust announced that the Bai Jerbai Hormasji Bhabha Scholarship has been awarded to Miss Armaity S. Desai and the Lady Meherbai Dorabji Tata scholarship to Miss Safia Mohomed-Abbas Hakim.

Andhra Minister's Suggestion on Rural Medical Aid

Dr V.. B. Raju, Minister for Planning, Andhra Pradesh, while inaugurating the First Intra-State Seminar on Social Services at Kurnool on June 27, declared that the State Government should address itself to the question of finding adequate medical personnel for the rural medical units, since the lack of such personnel was, at present, a major handicap in extending medical aid to rural areas.

He suggested that as a remedy, the medical students should be compelled to serve in rural areas for at least six months before securing their degree. The Minister, however, added that it was also true, that conditions of service for doctors in rural areas were not attractive and agreed that their lot should be improved. He was confident that the Government would consider this important aspect and do something tangible.

The two-day Seminar on Education, Social Education, Medical and Public Health and Tribal Welfare, which was held in the Kurnool Medical College, was attended by over 75 officials of those departments at the State and district levels.

Artificial Porcelain Teeth from Indigenous Raw Materials

A process for making artificial porcelain teeth from indigenous raw materials has been developed at the Central Glass and Ceramic Research Institute, Calcutta.

A process consists in preparing a fine powder of felspar and china clay mixed in proper proportions. After removal of traces of iron the stain is mixed and the powder is made into a dough with an organic binder and water. The teeth are made by pressing the dough in suitable moulds, finished and fired. They are then mounted on plastic bases or cardboard pieces for storage.

Porcelain teeth prepared by this technique compare favourably in all respects with the imported teeth. These teeth have been tested in the Calcutta Dental College and Hospital and also independently by two eminent dentists of Calcutta who have given favourable reports.

The main raw materials like felspar and china clay are easily available in the country. Colouring stains, palladium anchorages and gold coated nickel pins are the only items that, for the time being, have to be imported. Except the finishing equipment which has to be imported from abroad, most items of machinery required are available in India.

The requirements of artificial teeth in India, which are valued at Rs. 2 to 3 lakhs annually, have so far been met mostly from imports. The demand is expected to increase substantially.

Two types of artificial teeth, i.e., plastic teeth and porcelain teeth are commonly used. While the porcelain teeth are all imported, plastic teeth are being manufactured by a few firms on a small scale with imported moulding powder. It is generally stated that plastic teeth even when imported do not compare with porcelain teeth in quality, performance, durability and inertness to oral fluids, medicaments and food.

World Conference on Deafness

The largest international conference ever to be held on the educational problems of deafness starts at the University of Manchester on July 15 and will last nine days, states a B.I.S. Press release. About 1,000 delegates —all specialists concerned with deafness in children— from 36 countries are expected to attend.

Amang the Indians who are likely to attend are Dr. C. A. Amesur (Bombay), Mr. C. Chittenden (Madras), and Mr. G. N. Bose of the Indian High Commission in London.

The congress will consider all available information about the treatment of deafness in children and the education of deaf boys and girls through the work of medical services, audiology clinics and special schools.

New Process for Production of Vitamin C

The National Chemical Laboratory, Poona, has worked out a new process to produce vitamin C (ascorbic acid) in India, according to an official Press release.

Pilot plant work was carried out on a 10 lb. scale and the results obtained in laboratory experiments were found to be reproducible. The yield of vitamin C from sorbitol was approximately 42-46 per cent of theory. The final product was found to conform to the specifications of the Indian, British and U. S. Pharmacopoeias.

Major Dairy Schemes in Leading Cities

Four major dairy schemes, located at Delhi, Bombay, Calcutta and Madras, are in various stages of implementation, while another is due to make a start in the near future. The total outlay on these projects is of the order of Rs. 14 crores.

The Delhi milk scheme, including a dairy with a potential capacity of processing 14,000 maunds of milk daily, is the most ambitious.

The Bombay project comes next. This will be on the line of the Delhi Dairy, but will have only half the capacity handling some 7,000 maunds of milk daily. The dairy will supplement the Aarey Milk Colony which at present produces 3,000 maunds of milk daily. This capacity can be stepped up to 4,500 maunds. Land for the new Bombay dairy has been selected, but the scheme has been held up because of the difficulty of securing the necessary foreign exchange. Approaches have been made to one or two foreign Governments for assistance.

The Calcutta milk scheme is the costliest of the four, the total expenditure being estimated at Rs. 7 crores, of which Rs. 4·5 crores are to be incurred during the current plan period. The high cost of the scheme is due to the fact that it will be largely a colony to house the cattle and their owners scattered throughout Greater

Calcutta. When ready, it will produce 5,000 maunds of milk a day.

The Rs. 1·1 crore Madras scheme is also partly a colony.

The dairy proposed to be set up at Amritsar will not only meet the milk needs of the city population but it will also be in a position to supply milk products to other areas of the State. Estimated to cost Rs. 30 lakhs, it is just emerging from the final planning stage.

Pharmacy Council of India

Dr. B. C. Bose, Principal, Mahatma Gandhi Memorial Medical College, Indore, has been nominated as a member representing Madhya Pradesh State in the Pharmacy Council of India, in the place of Dr. K. N. Sinha, Professor of Pharmacology, Christian Medical College, Ludhiana.

REVIEWS

Elektroencephalographische Studien bei Hirntumoren—Von Priv.-Doz. Dr. R. Hess, Zürich. Mit einem Vorwort von Prof. Dr. H. Krayenbühl, Zürich. 1958. IV, 100 Seiten, 8 Abbildungen und ein Tabellenanhang, Gr.-8°, kartoniert DM 19.80.

Electroencephalographic Studies in Brain Tumours—By Dr. med. R. Hess, head of the electroencephalographic unit, Neurosurgical and Psychiatric Univ. Clinic, Zurich, with an introduction by Prof. Dr. H. Krayenbuhl, director, Neurosurgic. Univ. Clinic, Zurich (in German). IV, 100 pp., 8 illustr., Georg Thieme, Stuttgart, 1958. DM 19.80.

This is an important contribution to some controversial problems of brain tumour diagnosis by a very experienced worker in the field. For more than 20 years discussions continued about the significance of the E.E.G. in tumour diagnosis and localization. The present author clearly points out that this method can never be self-sufficient in localising a tumour because circumscribed disturbances of cerebral activity are found not rarely far away from the actual seat of the neoplasm. The question, therefore, is how and under which conditions such misleading foci are formed and whether it is possible to find some regularity even in such discrepancies of localisation which might be diagnostically helpful. The first question can be attacked only by methods of experimental neurophysiology and even then differences between man and animal present great difficulties. The author chose the other, the harder way, that of correlating E.E.G. recordings, operative localisation of tumour and neurological symptomatology with all the other clinical data available; in the present monograph only the first two, E.E.G. and localisation, have been worked out, based on more than 10,000 figures of 682 patients. Most of this huge material has been reproduced in tables, of which the essential findings have been discussed in the text. The main results are to be found in the summary of every chapter. Diagnostic conclusions of the present investigations have been tentatively pointed out but should be used only in the framework of the total findings; a still much bigger material would be required to establish their definite value in removing doubts in reading the curves. German terminology is not always adequate so that the English one was used along with it.

The contents are discussed under material and methods; the results are divided into normal findings; general alterations; conducted delta-rhythms; and the various local findings; combinations of single signs of the E.E.G.; discussion; summary and conclusions. Selected references to the fundamental literature conclude this volume which is a report of an enormous amount of careful work that had to be done essentially by one and the same man to avoid individual differences. Every neurologist, theoretical or practical, will have to study this deceptively slight volume.

Die neuzeitlichen Brustwand- und Extremitäten-Ableitungen in der Praxis—Von Prof. Dr. H. Reindell und Doz. Dr. H. Klepzig, Freiburg/Brsg. Mit einem Geleitwort von Prof. Dr. h. c. L. Heilmeyer, Freiburg/Brsg. 3., wesentlich umgearbeitete Auflage, 1958. VIII, 192 Seiten, 82 Abbildungen, Gr.-8°, Ganzleinen DM 29·50.

Modern Chest and Extremity Leads in Medical Practice—By Prof. Dr. H. Reindell and Doz. Dr. H. Klepzig, Freiburg/Brsg. with an introduction by Prof. Dr. h.c.L. Heilmeyer, director, Med. Univ. Clin., Freiburg/Brsg. (in German), 3rd considerably revised ed., VIII, 192 pp., 82 illustr., Georg Thieme, Stuttgart, 1958, DM 29·50.

The primary intention of the authors was to acquaint the German reader with all the changes in electrocardiography which the American pioneers have achieved in chestwall, and unipolar and augmented extremity leads during Germany's isolation and which were so fundamental that a complete re-orientation was required. In addition, the senior author has contributed to our knowledge of the borderline pictures between "still normal" and "already pathological" conditions, as well as to the complicated and important problem of differentiation between the various stages of hypertrophy.

This new edition, in conformity with the latest Anglo-Saxon manuals of electrocardiography, integrates vectorcardiography into the deeper understanding of the E.C.G. and adds further leads. More attention has been paid to alterations of P- and U- waves, and to the baffling pseudopathological changes of the T-wave which can be observed under certain conditions in cases of neurovegetative lability. Recent progress in the understanding of the E.C.G. in bilateral hypertrophy has also been included. The contents are arranged as usual. The section on various chest and unipolar extremity leads is followed by the chestwall E.C.G. under normal and pathological conditions, including that of the athlete's heart and of infants and children. The next chapters deal with the chest E.C.G. and the aV-leads in pathological left and right ventricular strain, and the bundle branch and arborization block. The main section (48 pp.) is devoted to a fairly detailed discussion of the diagnosis of infarction. This is succeeded by uncharacteristic disturbances of ventricular depolarization; disturbances of impulse formation; the W-P-W syndrome; precordially diminished

amplitude; distortions of the ST-segment and the T-wave due to the alterations of repolarization with unaltered spreading of the depolarization process. Finally, indications of taking chest- and aV- leads are discussed. Ten pages of references in various languages will show ways for further reading. The book is well printed and profusely illustrated, mainly with clearly reproduced E.C.G. tracings. Hospital doctors and practitioners who have to record and read elctrocardiograms without the help of an experienced cardiologist will find this publication helpful indeed.

Aids to Bacteriology (Students' Aids series)—By H. W. Scott-Wilson, B.SC., B.M. B.CH. (OXON.). Ninth edition, 1957. Baillière, Tindall and Cox, 7 & 8, Henrietta Street, London, W.C. 2, England. Pp. viii+404; price 12*s*. 6*d*.

Designed primarily to provide the medical student with a survey of the bacteria, viruses, fungi and protozoa of medical importance, within the limitations of its size, a good deal of informative material has been put in the volume. It is likely to be useful not only to the medical student preparing for his examinations, but the non-specialist practitioner will also find it a convenient guide to present-day bacteriology. Of added interest seems to be the Appendix in which the more common bacteria have been grouped according to their outstanding characteristics. The tables help easier identification of the organisms and are likely to be useful.

Annual Reports of the Central Research Institute, Kasauli, for the years 1953 and 1954—Paper cover, 9¼″×6½″; pp. 37 (1953) and 32 (1954); price Rs. 2/- or 3 sh. and Rs. 2·50 or 4 sh. respectively. Published by the Director, Central Research Institute, Kasauli, Punjab, India.

The reports cover two consecutive years. Each has five chapters and the same corresponding sections under each chapter. They make interesting reading and depict the amount of valuable work that is being carried on quietly at the remote hill station. It is to be desired that, as the reports are not voluminous, the subsequent ones may be published early, for better appreciation.

A Theory of Disease—By Arthur Guirdham, M.A., D.M., B.SC., D.P.M. Published 19th September 1957 by George Allen & Unwin Ltd., Ruskin House, 40 Museum Street, London, W.C. 1. Board bound 8¼×5¼ inches, 204 pp.; price 21*s*. net.

The word 'disease' in the title of the book implies morbidity as a whole. The author believes and tries to establish that proneness to disease is related to the degree of development of the personality and to the individual's awareness to it; that disease is essentially a total response of the whole personality even though it is manifested in local signs and symptoms. The author tries to show that even suggestion may play a part in the production of organic disease, and also that the mechanism of repression has an important role in determining the type of disease induced. He contends that in the treatment of disease, the alteration of mood and the amendment of the patient's sensory experiences are important and perhaps radical factors in the cure of disease, including physical disease. This is a somewhat unconventional but really thought-provoking book in which the author maintains that health is a by-product of religious experience, that our present-day conception of aetiology of diseases is too narrow, and that like the numbers in a combination lock, the different factors must be exhibited together before the disease symptoms make their appearance. This book should appeal to all who like to, and can, think beyond the grooves of current and accepted lines of thought.

The Forequarter Amputation—By H. F. Moseley, M.A., D.M., M.CH. (OXON.), F.R.C.S. (ENG. & CANADA), F.A.C.S. Published 1957 by E. & S. Livingstone Ltd., Edinburgh and London. Board bound, 11″×9″, pp. 79. Price 42*s*. net.

This is an excellent monograph covering an important item in general surgery. This book covers the historical aspects, the anatomical considerations, indications and operative procedures, with the chief emphasis placed on the detailed surgical anatomy of the shoulder region. In addition, is included a chronological case recording of traumatic avulsions of the forequarter; such an up-to-date listing is difficult to find in surgical literature. This monograph will certainly assist those who must undertake these major surgical procedures which still promise to continue to be necessary for a good while, in spite of the modern advances in antibiotic therapy and plastic surgery.

Fundamentals of Human Physiology for Students in the Medical Sciences—By W. B. Youmans, PH.D., M.D. Published 1957 by the Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, U.S.A. Board bound, 8¼″×5¼″, pp. 567; price $8·50.

As the title indicates, the author has presented the fundamentals of physiology in this book intended for students in the medical sciences. A considerable degree of the background material which is usually known to the students through courses in anatomy and biochemistry has been omitted. This has enabled the author to attain brevity while not sacrificing the objective of the book and the needs of those for whom it has been written. Moreover, the information concerning clinical physiology has become so extensive and important that it cannot nowadays be added satisfactorily to the basic textbook. Hence attempts at systematic coverage of clinical physiology has been left out. This has further helped to compress the size of the book. This is perhaps a wise step, for with the limited time available for the teaching of the fundamentals of physiology to students of the medical sciences, there is very little time available for systematic treatment of pathologic and clinical physiology in the initial course. It is hoped that medical students will find this volume of help in giving them a grasp of the fundamentals of human physiology.

Comparative Aspects of Haemolytic Disease of the Newborn—By C. Fulton Roberts, M.A., M.D. Published 25th November 1957, by William Heinemann Ltd., 99 Great Russell Street, London, W.C. 1. Board bound, 7½″×5″, pp. 199; price 17*s.* 6*d.* net.

Haemolytic disease of the newborn results from the immunisation of a mother against a blood group antigen possessed by her foetus but not by herself. Blood group incompatibility between mother and child is quite common, but haemolytic disease does not usually ensue unless two conditions co-exist, and not always then. First, the blood group antigen possessed by the foetus needs usually to be one of those normally powerful enough to evoke an antibody response in the mother. Secondly, the antigen must gain access to the antibody-forming tissues of the mother if immunisation is to result. In man, haemolytic disease is a cause of severe jaundice in the neo-natal period, probably associated with a general immaturity of the tissues. This combination of early and pronounced jaundice with general immaturity of tissues may also be found in premature infants. But in both cases, there is a grave risk of damage to the brain, with patchy pigmentation of the central nervous system. Haemolytic disease may apparently occur spontaneously with no evident cause of the mother's immunisation except as a consequence of pregnancy. The study of haemolytic disease embraces many aspects of the physiology and pathology of the newborn, and provokes many problems of serological and biochemical technique in the laboratory as well as of clinical and therapeutic assessment at the bedside. This book very ably offers a short account of the present-day views on haemolytic disease and immediately related matters. This book is very likely to be of interest not only to obstetricians and paediatricians, but also to geneticists and veterinarians.

Headache—Diagnosis and Treatment—By Robert R. Ryan, B.S., M.D., F.A.C.S. Second edition, 1957. The C. V. Mosby Company, St. Louis, U.S.A. Board bound, 8¼″×5¼″, pp. 421; price $6·75.

Headache is a very common, and often a baffling, condition the medical practitioner is called upon to treat, both in general and specialist practice. The more the attention given to headache problems, the more one begins to realise that there is much to be done in attempting to solve these problems which are often easy but sometimes are never solved. However, it is certainly true that, if both patient and physician have enough patience, together they will usually conquer their common foe. The author has discussed a very large number of possible different forms of pathologic conditions which produce headache—some of these are common and everyday affair while a few are extremely rare and may never be seen by the average physician. With each form of the headache problem, the author has given the usual symptomatology of an average case. It must however be kept in mind that all cases may have their atypical forms. The author stresses that one of the most important factors in solving a headache problem is the taking of a good history, and has discussed this point rather thoroughly. The subject of headache has been discussed in this book in an interesting manner for every member of the medical profession, regardless of his field.

Histology—By Arthur Worth Ham, M.B., F.R.C.S. Third edition, 1957; published in Great Britain by Pitman Medical Publishing Co., Ltd., 45 New Oxford Street, London, W.C. 1. Board bound, 10¼″×7½″, pp. 894, with 582 figures including 8 plates in colour. Price 80*s.* net.

The third edition appears to have been thoroughly revised and brushed before being presented to the readers. Since the first edition of this book in 1950, there has been a major revolution in histology. Formerly microscopic anatomy was, for all practical purposes, a subject studied with the light microscope. Since 1950, however, techniques have been evolved which permit sections of well-fixed tissue to be cut thinly enough to be examined and photographed in the electron beam. This development has raised the effective magnification at which tissue can be profitably examined from something over one thousand to fifty or even one hundred thousand. These revolutionary advances in tissue study made possible through electron miscroscopy have been described in this book in a simple and orderly way. Through easy-to-follow text linked with carefully chosen and visual aids, Dr. Ham demonstrates how and why these new developments provide a better understanding of physiological histochemical and pathological processes. Also there has been such great interest in the transplantation of tissues that special consideration has been given to this subject. This book is a really valuable and noteworthy addition to the literature.

YOUR QUESTION

Correspondents should give their names and addresses (not necessarily for publication) and include all relevant details of the questions which should be typed. Questions of medical interest only will be accepted for this section. They should be sent in a separate envelope marked "Your Questions." Questions of general interest will be published in preference. Lack of space precludes answering all the questions received.

Technique of Male Sterilisation

Q. (*a*) Will you please publish through your journal the detailed technique of male sterilization, so that this operation can be done even by a general practitioner? (*b*) Has it got any post-operative psychological hazard?

Ans. (*a*) It is considered dangerous to perform operations with a theoretical knowledge.

Publication of the specialised technique is therefore not desirable. A general practitioner has to have a special training with a surgeon who does this operation frequently.

(*b*) Yes. There are definite post-operative psychological hazards.

Will it be a boy or a girl ?

Soon the anxious waiting will be over, and everyone will know. Today, and every day people put their trust in medicine. Doctors and nurses in hospitals all over the country put their trust in Indian Oxygen equipment and gases—a trust that is well founded.

ANÆSTHESIA

INDIAN OXYGEN LTD

IOAX/64B

SALAMIDE

for acute rheumatism, gout, arthritis, fibrositis, lumbago, torticollis, pleurodynia, panniculitis, neuralgia and neuritis.

ADVANTAGES :

- Salicylate therapy with minimum toxicity.
- Powerful analgesic and anti-pyretic.
- Rapid effects.
- No effect on prothrombin.
- Maximum cardiac safety.

SMITH STANISTREET & CO., LTD.

HEAD OFFICE, FACTORY AND LABORATORIES
18, CONVENT ROAD, CALCUTTA 14.

PSST 37

for controlled iodine therapy

COLLOSOL IODINE

a compound of iodine and the products of acid hydrolysis of a protein, the solution being rendered isotonic with tissue fluids. Collosal Iodine is one of the most versatile remedies in everyday practice and may be administered orally or parenterally with no risk of a sudden liberation of free iodine.

Packings: 4 oz., 20 oz., 80 oz. bottles
0.2%—5 ml. and 10 ml. amps.—boxes of 6
0.4%—Boxes 6 x 10 ml. amps. & 30 ml. vials
0.8%—Boxes 6 x 10 ml. amps. & 30 ml. vials
1.0%—Boxes 6 x 1 ml. amps. & 10 ml. vials

THE CROOKES LABORATORIES LIMITED
(Incorporated in England. The Liability of Members is limited)
COURT HOUSE, CARNAC ROAD, BOMBAY-2

LEUKORA

for GYNÆCOLOGICAL DISORDERS

Composed of :—

Each fluid ounce of LEUKORA contains :

EXTRACTS FROM :—

Caesalpinia Sappan wood (Eng-Sappan wood) ...	... 40 mgs.
Acacia Catechu (Khadir)	... 40 mgs.
Adhatoda Vasica (Vasak)	... 40 mgs.
Sida Cordifolia (Berela)	... 40 mgs.
Ichnocarpus Frutescens (Shyamalata) ...	... 40 mgs.
Hemidesmus Indica (Anantamul) ...	... 40 mgs.
Mangifera Indica (Mango Seed) ...	... 40 mgs.
Berberis Asiatica (Daruharidra) ...	... 40 mgs.
Swertia Chirata (Chirata)	... 40 mgs.
Cumminum Cyminum (Jira)	... 40 mgs.
Aegle Marmelos (Bael)	... 40 mgs.
Ferri Sulph.	... 40 mgs.
Extractum Berberidis (Rashanjan, Rasaut) ...	... 40 mgs.
Syrup & Flavouring agent	... q.s.

For further particulars write to :—

ADCCO LIMITED

29/3A, CHETLA CENTRAL ROAD,
CALCUTTA-27.

'DETTOL'

Regd.

guards against infection

- **Disinfection of instruments**
- **Washing and disinfecting hands**
- **Pre-operative skin disinfection—and wherever there is danger of infection**

Free Write for "Dettol Products" Booklet

Atlantis (East) Limited
(Incorporated in England)
P. O. Box 9009, Calcutta 16

DIN-1

AEL 1301

In
"COLD" and "RHINITIS"
R/
RINANTA tablets.

Contains the new synthetic antirhinitic drug DIPHENIN (0.3 mgms and Salicylamide 300 mgms per tablet.

STOPS SNEEZING, CONTROLS NASAL IRRITATION, RUNNING OF THE NOSE, HEAVINESS OF THE HEAD ETC. MAKES ONE FIT TO CONTINUE ONE'S WORK.

FREE FROM NARCOTICS 'ANTIHISTAMINICS' OR ANY HABIT-FORMING DRUGS. VERY WELL TOLERATED BY ADULTS AND CHILDREN.

●

Phytosynth Laboratories
P. B. No. 85, COCHIN-2.

Syrup Allarex

As an ideal combination of reputed indigenous antispasmodic drugs, e. g. Kuth, Kantikari with ephedrine, aminophyllin etc., SYRUP ALLAREX offers extraordinary relief in a large variety of Asthmatic conditions.

●

For literatures and samples, apply

Mendine Pharmaceutical Works
36B, Alipore Road, Calcutta-27.

RESOTREN

for causal therapy of
intestinal and extraintestinal
AMOEBIASIS
highly effective well tolerated

Packings
Tubes of 20 tablets of 0·5 g.
Bottles of 300 tablets of 0·5 g.

»Bayer« Leverkusen, Germany

SOLE IMPORTERS IN INDIA
CHOWGULE & CO. (HIND) PRIVATE LTD.
P.O. BOX 1478, BOMBAY 1.
Branches :
P. O. Box 8943, Calcutta 13
P. O. Box 3738, Madras 2

NEW!

Mercurial Diuretic

Safe and Versatile

'THIOMERIN'...

The product of choice for the production of safe, smooth and gentle diuresis. The least toxic of mercurial diuretics with only two cases of abscess reported after 23,000 injections* administered *subcutaneously*. Literature on request.

Indications : Cardiac Oedema (peripheral or pulmonary)—Nephrotic Oedema—Ascites of Liver Disease—carefully selected cases of Subacute and Chronic Nephritis.

Supplied in multidose vials of 1.4 *gm. with* 10 *cc. Water for Injection U.S.P.*

**Bay, E. B.: Treatment of congestive heart failure in the home, Modern Concepts of Cardiovascular Disease, Am. Heart Assn., Vol. 18, No. 3, pp. 35-36 (March) 1949.*

℞

'THIOMERIN' TRADE MARK **Sodium**

Wyeth

JOHN WYETH & BROTHER LIMITED

(Incorporated in England with Limited Liability)

Steelcrete House, Dinshaw Wacha Road, Bombay 1

TRADE WINGS

INTERNATIONAL TRAVEL AGENTS

With the 1956 Record of having handled
the first I M A Tour to Europe

proudly announce

YET ANOTHER "FIRST EVER" STUDY TOUR TO

USSR

for IMA members & their wives only. Duration : 17 days

Commencing Third Week August 1958

TRAVEL BY LUXURIOUS MODERN SUPER-CONSTELLATION

AND RETURN BY TU 104, RUSSIA'S LATEST COMMERCIAL JET AIRCRAFT

CONTACT

TRADE WINGS

30/32 Rampart Row, Bombay 1 • 60 Janpath, New Delhi • 15 Old Court House St., Calcutta 1
5-8-616, Abid Road, Hyderabad (Dn.) • 267, Mahatma Gandhi Road, Poona

XXXV ALL-INDIA MEDICAL CONFERENCE, CUTTACK

The Organisers of the XXXV All-India Medical Conference have issued the following : —

The 35th Annual Conference of the Indian Medical Association will be held at Cuttack, Orissa, during the last week of December, 1958. The conference will be attended by about 2000 delegates and distinguished visitors from all over India.

A Souvenir will be published to commemorate this happy occasion and about 4000 copies will be distributed.

A Scientific & Industrial Exhibition will be held during the conference, depicting the most modern advancement in medicine and allied sciences.

Those who are associated with the development and progress in the modern system of medicine are hereby requested to extend their active co-operation to make the conference a real success.

Interested participants may please correspond with :

Organising Secretary

XXXV ALL-INDIA MEDICAL CONFERENCE

S. C. B. MEDICAL COLLEGE COMPOUND, CUTTACK-1 (ORISSA)

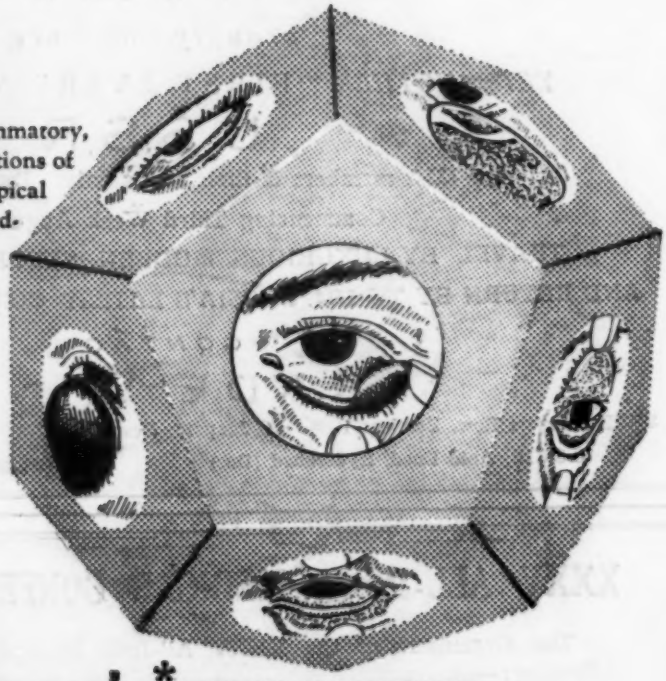
(Gram :—' MEDORA ' Cuttack)

Printed by Sri Tarani Kanta Basu at Sri Gouranga Press Private Ltd., 5, Chintamani Das Lane, Calcutta-9 and published by him on behalf of the Indian Medical Association from 23, Samavaya Mansions, Corporation Place, Calcutta-13.
Editor—Dr. P. K. Guha, M.B., M.R.C.S. (Eng.), D.O.M.S. (Lond.)

multiple, manifold and varied

Pfizer

are the inflammatory, infectious and allergic conditions of the eye which respond to topical therapy with the famed broad-spectrum antibiotic, Terramycin, the powerful anti-inflammatory hormone, Cortril, and combinations of these agents. Each has outstanding advantages for particular indications.



Terramycin*

brand of oxytetracycline

OPHTHALMIC OINTMENT
with Polymyxin B Sulfate
(5 mg. of Terramycin and 10,000 units of Polymyxin B Sulfate per Gm.) in ⅛oz. tubes.

OPHTHALMIC SOLUTION
(25 mg. of Terramycin in 5cc. dropper vials)

Cortril*

brand of hydrocortisone

OPHTHALMIC OINTMENT
(In two strengths: 0.5% [5 mg. per Gm.] and 2.5% [25 mg. per Gm.] of hydrocortisone acetate) in ⅛ oz. tubes.

Terra-Cortril*

brand of oxytetracycline and hydrocortisone

OPHTHALMIC SUSPENSION
(5 mg. of Terramycin and 15 mg. of hydrocortisone acetate/cc.) in 5 cc. bottles with eye dropper.

Pfizer *World's Largest Producer of Antibiotics*

VITAMIN—MINERAL FORMULATIONS HORMONES

PFIZER EASTERN CORPORATION, NEW YORK, PANAMA & BRUSSELS.

Exclusive Distributors in India:

RAVISON PHARMACEUTICALS LTD.

POST BOX No. 1636, BOMBAY 1. 'GRAMS: 'RAVIPHARM'

*Trademark of Chas. Pfizer & Co., Inc.